
Appendix C:

Environmental Management Programme



Appendix C1:

Site Environmental Management Programme



ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED DE RUST PV 1 SOLAR ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE ON PORTION 1 OF THE FARM SAMOEP 147, NORTHERN CAPE

May 2023

NAME OF APPLICANT: FE De Rust (PTY) LTD

PREPARED BY: Enviro-Insight CC

PROJECT DETAILS

REPORT TITLE:	PROPOSED DE RUST PV1 SOLAR ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE ON PORTION 1 OF THE FARM SAMOEP 147 NEAR POFADDER IN THE NORTHERN CAPE
REPORT STATUS:	DRAFT ENVIRONMENTAL MANAGEMENT PLAN
DEA REFERENCE NO.:	14-12-16-3-3-2-2259
APPLICANT:	FE DE RUST PTY LTD
ENVIRONMENTAL ASSESSMENT PRACTITIONER:	ENVIRO-INSIGHT CC MARVIN GRIMITT
ENVIRONMENTAL CONSULTANT:	ENVIRO-INSIGHT CC RONELL KUPPEN BSC (HONORS) GEOGRAPHY IAIASA MEMEBER
DATE	MAY 2023

When referenced this report should be cited as: Enviro-Insight CC. (2022). EMPr for the Proposed De Rust PV1 Solar Energy Facility and associated infrastructure on Portion 1 of the Farm Samoep 147 near Pofadder in the Northern Cape

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ABBREVIATIONS

BID	Background Information Document
CARA	Conservation of Agricultural Resources Act
CBA	Critical Biodiversity Area
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIR	Environmental Impact Report
EMFs	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GIS	Geographical Information System

GNR	Government Notice Regulation
ha	Hectare
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IUCN	International Union for Conservation of Nature
NEM: BA	National Environment Management: Biodiversity Act (Act 10 of 2004)
NEM: WMA	National Environmental Management: Waste Management Act (Act No. 59 of 2008)
NEMA	National Environmental Management Act (Act 107 of 1998) (as amended)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act
PPP	Public Participation Process
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SDF	Spatial Development Framework
SDP	Spatial Development Plan
SCC	Species of Conservation Concern

DEFINITIONS AND TERMINOLOGY

Activity: means an activity identified in any notice published by the Minister or MEC in terms of section 24D(1)(a) of the NEMA as a listed activity or specified activity

Alternatives: in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the—

- (a) property on which or location where the activity is proposed to be undertaken;
- (b) type of activity to be undertaken;
- (c) design or layout of the activity;
- (d) technology to be used in the activity; or
- (e) operational aspects of the activity;

and includes the option of not implementing the activity;

Application: an application for an environmental authorisation in terms of Chapter 4 of the EIA Regulations (2014 as amended).

Biodiversity: Variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part and also includes diversity within species, between species, and of ecosystems.

Cumulative impact: in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

Development: the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.

Development footprint: any evidence of physical alteration as a result of the undertaking of any activity.

Environmental authorisation: The Competent Authority's grant or denial of permission to undertake the proposed activity. Previously referred to as the Record of Decision (RoD).

EAP: an environmental assessment practitioner as defined in section 1 of the NEMA.

EMPr: an environmental management programme contemplated in regulation 23 of the EIA Regulations (2014 as amended).

Environmental Impact Assessment: a systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.

Mitigation: to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible.

Registered interested and affected party: in relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42 of the EIA Regulations (2014 as amended).

Significant Impact: an impact that may have a notable effect on one or more aspects of the environment or may result in noncompliance with accepted environmental quality standards, thresholds or targets and is determined through rating the positive and negative effects of an impact on the environment based on criteria such as duration, magnitude, intensity and probability of occurrence.

Specialist: a person that is generally recognised within the scientific community as having the capability of undertaking, in conformance with generally recognised scientific principles, specialist studies or preparing specialist reports, including due diligence studies and socio-economic studies. A specialist needs to be professionally registered (e.g. with the South African Council for Natural Scientific Professions).

General Site Information

Component	Description / Dimensions
Project Name	De Rust PV 1 Solar Energy Facility
Province	Northern Cape
Farm portion	Portion 1 of the Farm Samoep 147
Development Extent (ha)	515 hectares
21-digit Surveyor General code	C03600000000014700001
Contracted capacity of the facility (MW)	240 MW (Maximum)
Cabling	Underground up to 1m deep
Capacity of onsite substation	240MW (33/132kV (100mX100M))
Grid connection	Proposed Korana Substation
Width of internal roads	Construction phase: up to 10m Operational phase: up to 8 m
Proximity to grid connection	+/-10km approximately
Height of Fencing	1.8m – 2.1m
Laydown areas	Construction period laydown footprint (temporary): ± 6 ha Temporary hardstand area (boom erection, storage and assembly area): ± 12 ha O&M Area: 1.1ha
Contracted capacity of the facility (MW)	240 MW (Maximum)

1 INTRODUCTION

FE De Rust (Pty) Ltd (hereafter the Applicant) is proposing the development of a Solar energy facility (SEF) and associated infrastructure on a site located approximately 23 kilometers (km) south of Pofadder in the Northern Cape province of South Africa. The proposed development will have a generation capacity of up to 240MW which will feed into the National Grid.

The proposed study area for the SEF located approximately 23 km south of the town of Pofadder within the Khâi-Ma Local Municipality, in the Northern Cape Province of South Africa. The site can be reached via the R358, which branches off the N14. The De Rust PV 1 SEF footprint is approximately 515 hectares (ha) and will be located on Portion 1 of the Farm Samoep 147.

The De Rust PV1 SEF will consist of PV panels, with a generation capacity of 240MW, depending on the available technology at the time. Additional ancillary infrastructure to the SEF would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), mounting systems to support the PV panels, internal/ access roads (up to 10 m in width) linking the PV panels and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. As far as possible, existing roads will be utilised and upgraded (where needed) with the relevant stormwater infrastructure and gates constructed as required. The perimeter of the proposed SEF may be enclosed with suitable fencing. A formal laydown area for the construction period, containing a temporary maintenance and storage building along with a guard cabin will also be established.

1.1 APPLICANT DETAILS

Table 1-1: Applicant Contact Details

Applicant	FE De Rust (Pty) Ltd
Contact Person	Thomas Condesse
Address	Ground Floor, Sable Corner, 15 Bridgeway Road, Bridgeways Precinct, Century City , 7441
Telephone	+33622665932 / 0845484264
Email	thomas.condesse@energyteam.co.za / millard.kotze@energyteam.co.za

1.2 PROJECT TEAM

1.2.1 Environmental Assessment Practitioner (EAP)

Client has appointed Enviro-Insight CC as an independent Environmental Assessment Practitioner (EAP) to undertake an environmental authorisation process for the proposed De Rust PV1 SEF. Enviro-Insight CC has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations (2014, as amended). For purposes of this report, the following person may be contacted at Enviro-Insight CC:

Table 1-2: Enviro-Insight contact details

Company	Enviro-Insight CC
Contact Person	Marvin Ryan Grimett /Ronell Kuppen
Purpose	Project consultant and Environmental Consultants
Address:	Unit 8 Oppidraai Office Park, 862 Wapadrand Road, Wapadrand Security Village, Pretoria, 0081
Telephone:	012 807 0637
Email:	info@enviro-insight.co.za

1.2.1.1 Qualifications and Memberships (Appendix F)

Mr. Grimett holds a Bachelor of Social Science (Honours)- Geography and Environmental Management and is registered as an EAP (2019/1713.) with EPASA. He has more than 7 years' experience as an environmental assessment practitioner.

Ms. Kuppen has an BSc (Honours) degree in Geography, with approximately 10 years' experience in the environmental consulting field, ranging from EIA's, WULAS and Public Participation.

1.2.1.2 Summary of past experience (Appendix F)

Mr. Grimett has over seven years' experience as an environmental consultant, compiling and managing several environmental authorisation reports, including Environmental Management Programmes (EMPr), rehabilitation plans and environmental auditing. This included fieldwork, data collection, preparation of permits and licensing studies, compliance monitoring and community engagement, and project managing interdisciplinary teams and contractors.

Ms. Kuppen has approximately 10 years' experience in the environmental consulting field, ranging from EIA's, WULAS and Public Participation and ECO's

1.2.2 Specialists

Specialist studies is being undertaken to address the key issues that require further investigation to address the impacts of the development on the receiving environment. The specialist studies involve the gathering of data relevant to identifying and assessing impacts that may occur as a result of the proposed project. The specialists will also recommend appropriate mitigation or optimisation measures to minimise potential negative impacts or enhance potential benefits, respectively.

Enviro-Insight has selected a team of highly experienced specialists in order to execute this in a professional and impartial manner. The project team, specifically the sub-consultants, is indicated in Table 1-3.

Table 1-3: EIA Project Team.

Specialist Assessment	Company	Professional Specialist
Terrestrial Biodiversity	Enviro-Insight CC	Corné Niemandt Pr.Sci.Nat. Samuel Laurence Pr.Sci.Nat. Alex Rebelo Cand.Sci.Nat.
Sensitive Plant Species	Enviro-Insight CC	Corné Niemandt Pr.Sci.Nat.
Avifauna	Enviro-Insight CC	Samuel Laurence Pr.Sci.Nat. AE Van Wyk Cand.Sci.Nat.
Aquatic Biodiversity	Tate Environmental	Russell Tate Pr.Sci.Nat.
Socio-economic	Independent social sciences consultant	Tony Barbour
Traffic	Innovative Transport Solutions Global	Pieter Arangie
Heritage and Paleontological	HCAC	Jaco van der Walt
Agriculture Compliance Statement	Independent Consultant	Johann Lanz

Neither Enviro-Insight nor any of its sub-consultants are subsidiaries of *FE De Rust Pty Ltd*, nor is *FE De Rust Pty Ltd* a subsidiary to Enviro-Insight. Enviro-Insight, its sub-consulting specialists, do not have any interests in secondary or downstream developments that may arise out of the authorisation of the proposed project.

1.3 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

This Environmental Management Programme (EMPr) interprets the findings of the environmental Basic Assessment (EIR) and prescribes project-specific specifications to be achieved. In addition to the requirements of Appendix 4 of GN R 982, this EMPr is based on the principles of Integrated Environmental Management (IEM). The EMPr is a progressive working document which must be updated based on the relevant conditions stipulated in the Environmental Authorisation. The EMPr must then be submitted to DFFE (along with the final approved layout) for approval prior to the commencement of construction.

The objective of the EMPr is to provide measures to mitigate and manage construction, operation and decommissioning activities in order to minimize potential negative impacts on the surrounding environment. This is achieved by:

- Assigning environmental impact mitigation responsibilities to key personnel,
- Developing specific action plans designed to ensure mitigation,
- Managing and auditing the specified action plans, and
- Managing stakeholder involvement.

This EMPr serves as a standalone document to be disseminated to and used by the contractors and other stakeholders involved throughout the Life of the Project.

1.3.1 Assigned responsibility

In order for the EMPr to be effectively implemented the following professional inputs will be required:

- Applicant – Responsible for the following:
 - Ensuring that the appointed engineers and contractors comply with the approved EMPr.
 - Ensuring compliance with the provisions for duty of care and remediation of damage in accordance with section 28 of the National Environmental Management Act (NEMA), (No. 107 of 1998) and its obligations regarding the control of emergency incidents in terms of Section 30 of NEMA.
 - Notifying DFFE of any incident as defined in subsection 30(1)(a) of NEMA.
- Project Manager – Responsible for the following:
 - Appointing the appropriately qualified contractor to co-ordinate, supervise and expedite different action plans.
 - Ensuring adherence to the DFFEs conditions of authorization and any other laws and standards relevant to the construction of the facility.
 - Ensuring all elements of the work undertaken are properly and competently directed, guided and executed at appointed stages of the project.
 - Ensuring the adherence to statutory safety, health and environment (SHE) standards and ensuring the construction activities comply with the EMPr.
 - Monitoring the site on a daily basis to ensure compliance.
 - Overall responsibility and accountability for the site during the construction phase.
 - Avoiding and / or mitigating adverse impacts on the environment by the appropriate design and construction.
 - Ensuring transparency in their operation and environmental management of the site.
 - Managing the contractor's compliance and ensure documentation management.
 - Ensuring that the contractor has a copy of the EMPr and all agreed Method Statements.
- Contractors - Responsible for the following:
 - Managing and operating their activities with due care and diligence.
 - Complying with all elements of the EMPr.
 - Ensuring that stakeholder interest is reported to the ECO.
 - Maintaining relevant documentation for review by the ECO.
- ECO (Environmental Control Officer) - is responsible for the following:
 - Determining the conformance of the site with the EMPr criteria and compliance with the conditions of the EMPr.
 - Liaising with the DFFE and I&APs, if required.

- Identification of possible areas of improvement during construction.
- Undertaking on-going monitoring of the construction site through regular site visits and record key findings. This includes photographic monitoring of the construction site. The frequency of these visits will be determined by the progress and complexity of the project.
- Advising the Project Manager and the contractors on environmental matters during the construction phase of the development.
- Monitoring implementation of the EMPr by the contractor.
- Advising the project manager on environmental impacts and provide appropriate recommendations to address and rectify these matters.
- Ensuring that the conditions stipulated in the EA and any other laws and standards relevant to the construction are being complied with.

1.3.2 Names and Telephone Numbers of Contact Persons

NAME	DESIGNATION	ORGANISATION	CONTACT NUMBER
Thomas Condesse	Applicant	FE De Rust Pty Ltd	+33 62 266 5932
Ronell Kuppen	Independent Environmental Consultant	Enviro-Insight CC	012 807 0637
	Environmental Control Officer	Not appointed yet	
	DFFE Compliance	DFFE Official	021 941 6189
	Municipality	Khai Ma Local Municipality	054 933 1000
	DWS Official	DWS	053 830 8800
	Fire Department	Khai Ma Local Municipality	101 77- General 074 743 6394
	Emergency Response		10177, 054 933 0096
	Police	SAPS	10111 – General 054 933 1126 / 054 933 0022
	Emergency Spill Response	Abzorbit (24 Hour response)	24 hr Emergency Response 083 269 8790 083 2536618

1.3.3 Compliance

A copy of the EMPr must be available on site at all times. Compliance with all elements of the EMPr must be reviewed on a daily basis by the site engineer and all responsible parties must sign the acceptance letter in Appendix 1. In addition, it must be

noted as per the Environment Conservation Act and the National Environmental Management Act No 107 of 1998 (Section 28) offending parties will be held financially accountable for any pollution or environmental damage.

1.3.4 Monitoring

The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. Monitoring for non-compliance must be done on a daily basis (using attached appendices) by the contractors under the guidance of the Project Manager / Environmental Officer / Engineer. An appropriately timed audit report should be compiled by the independent ECO. Paramount to the reporting of non-conformance and incidents is that appropriate corrective and preventative action plans are developed and adhered to. Photographic records of all incidents and non-conformances must be retained.

1.3.5 Applicable Legislation

The following environmental legislation must be adhered to:

- Constitution of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No 107 of 1998) – NEMA
- EIA Regulations (2014, as amended)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- National Heritage Resources Act (Act No 25 of 1999)
- National Forests Act (Act No. 84 of 1998)
- National Water Act (Act No 36 of 1998)
- National Environmental Management: Waste Act (Act No 59 of 2008)
- National Environmental Management: Air Quality Act (Act No 39 of 2004)
- Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)
- National Veld and Forest Fire Act 101 of 1998
- Hazardous Substances Act (Act No. 15 of 1973)
- Occupational Health and Safety Act (Act No 85 of 1993)
- National Standards (SANS10103-2003)
- Environment Conservation Act (Act No 73 of 1989)
- Civil Aviation Act (Act 13 of 2009)

1.3.6 Layout of the EMPr

This EMPr is site and impact specific. Sections 1 and 2 are introductory sections whilst Section 3 forms the bulk of the report. Section 3 has been designed so that each element is investigated for the different phases of development (i.e. construction, operation and decommissioning). The layout of this EMPr allows for the users to quickly and efficiently locate and use relevant

sections as the need arises, e.g. In the event of a diesel spill on site the contractor can quickly locate and apply Section 3.7 of the EMPr.

2 DESCRIPTION OF THE PROPOSED PROJECT

2.1 NATURE AND EXTENT OF PROPOSED PROJECT

The proposed study area for the SEF development is located approximately 23 km south of Pofadder. The site can be reached via the R358 which branches off the N14 (Figure 1 1). The De Rust Solar PV 1 SEF footprint is approximately 446 hectares (ha) and will be located on Portion 1 of the Farm Samoep 147.

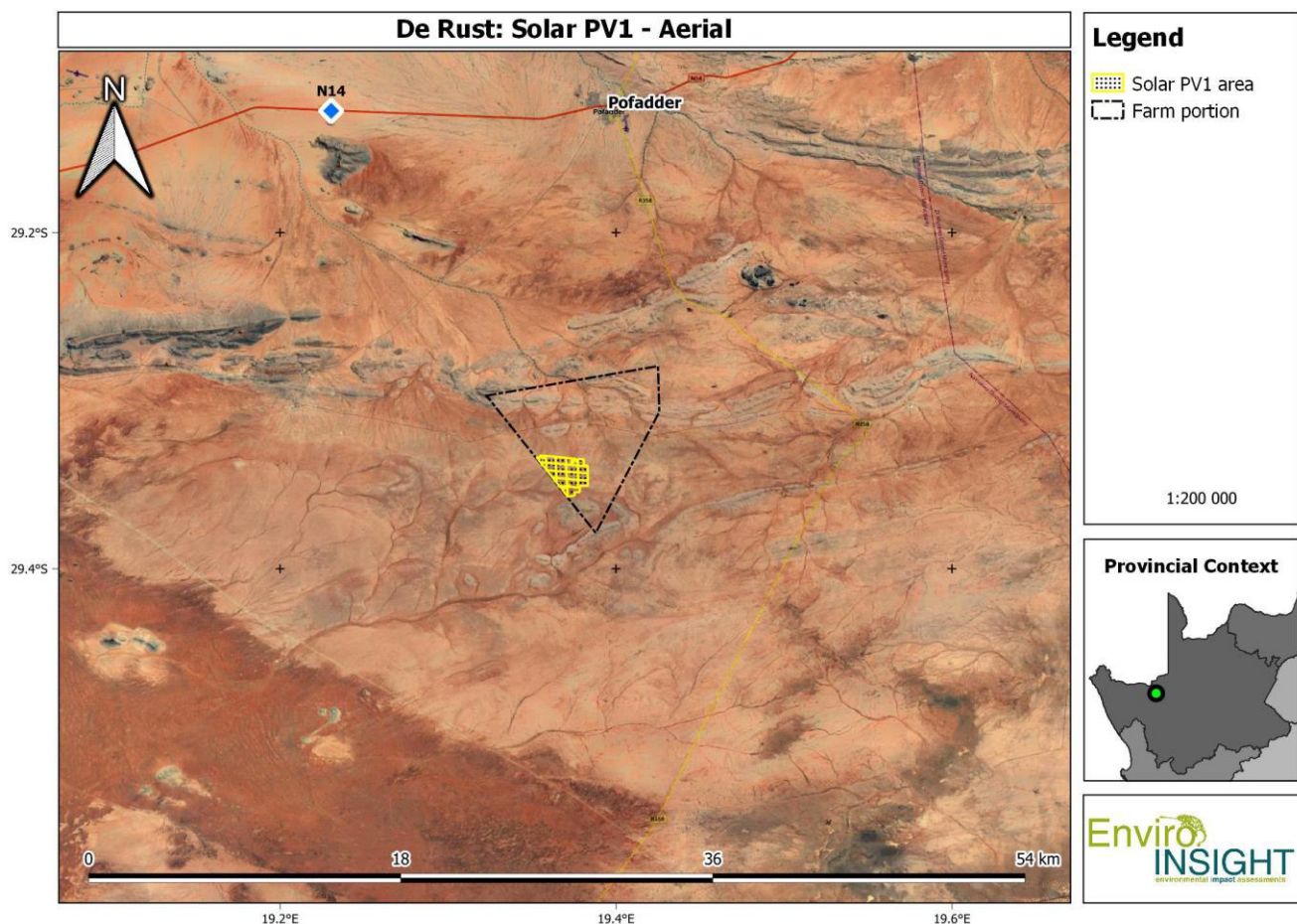


Figure 2-1: Locality map of the proposed study area.

Table 2-1: Project Location Details.

De Rust PV1 SEF

Farm name(s)/ Erf No	Portion 1 of the Farm Samoep 147	
21-digit Surveyor General code	C03600000000014700001	
Ward	6	
Local Municipality	Khâi-Ma Local Municipality	
District Municipality	Namakwa District Municipality	
Co-ordinates of the proposed site/s (DDMMSS)	Latitude (S)	Longitude (E)
	Point A	29°20'12.01"S
Point B	29°20'6.63"S	19°23'0.69"E
Point C	29°21'7.54"S	19°23'1.95"E
Point D	29°21'26.38"S	19°22'17.09"E
Mid-Point	29°20'40.31"S	19°22'20.44"E
State the extent of proposed development	approximately 515 hectares	
What is the current zoning and current land use of the site(s)?	Agricultural	

2.2 PROJECT DESCRIPTION

The proposed De Rust PV1 SEF will consist of PV panels, with a generation capacity of 240MW, depending on the available technology at the time. Additional ancillary infrastructure to the SEF would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), mounting systems to support the PV panels, internal/ access roads (up to 10 m in width) linking the PV panels and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. As far as possible, existing roads will be utilised and upgraded (where needed) with the relevant stormwater infrastructure and gates constructed as required. The perimeter of the proposed SEF may be enclosed with suitable fencing. A formal laydown area for the construction period, containing a temporary maintenance and storage building along with a guard cabin will also be established.

The components of the SEF and associated infrastructure are as follows:

- PV panels will have a generation capacity of up to 240 MW (depending on the available technology at the time),
- PV Panel Mounting System,
- onsite substation/s of 100mX100m (33/132kV) to facilitate the connection between the SEF and Aggeneys substation,
- a Battery Energy Storage System (BESS),
- cabling between PV panels, to be laid underground,

- internal/ access roads (up to 10 m in width) linking the PV panels rows and other infrastructure on the site,
- permanent workshop area and office for control, maintenance and storage, and
- temporary laydown areas during the construction phase (which will be rehabilitated).

The final PV Panel model to be utilised will only be determined closer to the time of construction, depending on the technology available at the time. The optimal positioning (taking into account the energy generating potential) for each panel will be determined once all the environmental sensitivities have been determined in the EIA phase. The preferred layout design and development footprint is included in the EIAr.

The components of a typical solar facility subsystem are depicted by **Error! Reference source not found.** and **Error! Reference source not found.**, which entails:

- Photovoltaic Cells: Solar cells can be arranged into large groupings called arrays. These arrays, composed of many thousands of individual cells, can function as central electric power stations, converting sunlight into electrical energy for distribution to industrial, commercial, and residential users.
- Support Structures (Solar Panel Mounts)– The PV Panels will require a supportive structure. These can either be a fixed structure, where the panels are placed at an angle to obtain maximum solar irradiation, or it could be axis tracking support structure that will track the movement of the sun throughout the day to maximise solar irradiation. The preferred layout will be determined during construction.

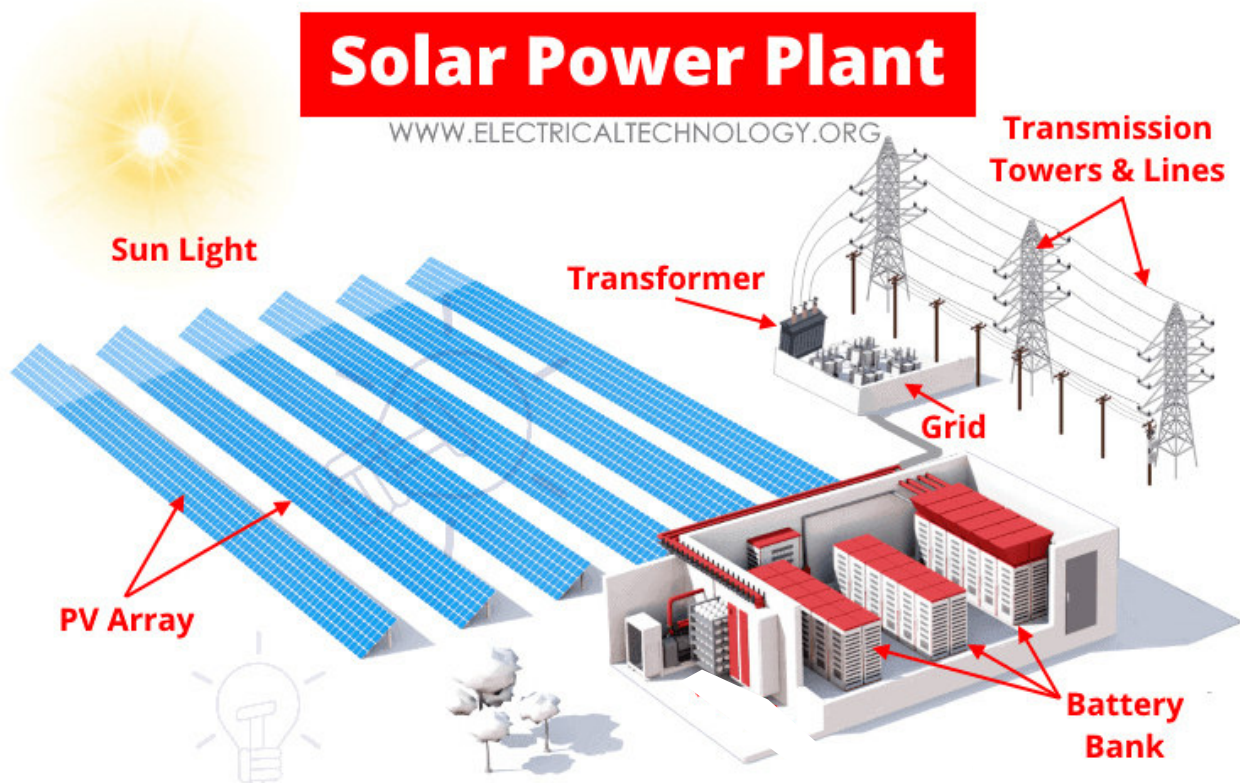


Figure 2-2: Simplified diagram of the main components of a Solar Facility. (Source: <https://www.electricaltechnology.org>).

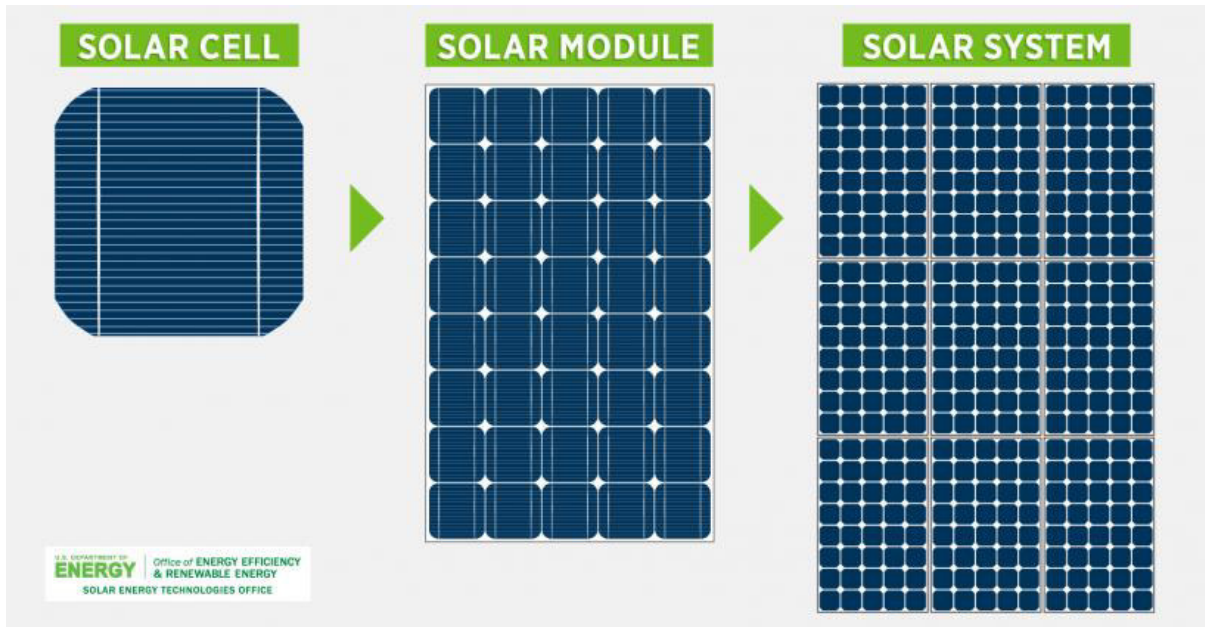


Figure 2-3: Simplified diagram of the PV System from PV cell to module to PV Array. Source: www.energy.gov

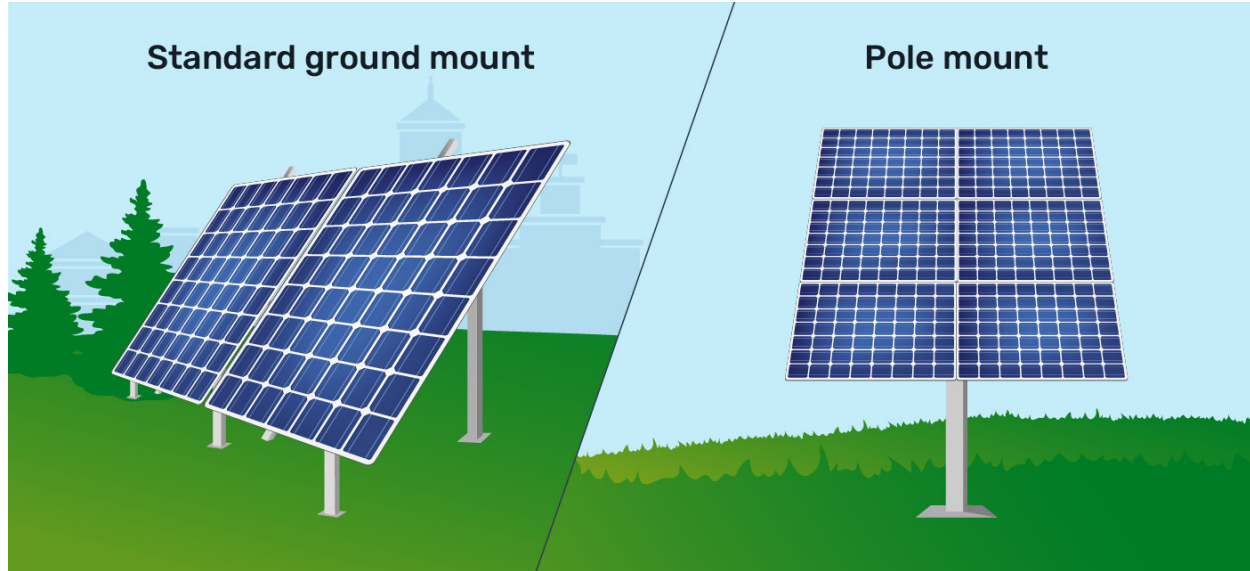


Figure 2-4: PV Solar Panel Mounts. Source: www.solarreviews.com.

2.3 PROJECT DEVELOPMENT PHASES

The following section describes the details the different phases of the proposed De Rust PV1 SEF:

- Pre-construction;
- Construction;
- Operation; and
- Decommission.

Pre-construction

Prior to the commencement of the main construction works, the Contractor will undertake vegetation clearance and site establishment works.

This phase ensures that all design layouts are finalised, that risks associated with the construction phase is discussed and mitigated prior to commencement, to do a final walkdown of the study area and to apply and secure the necessary permits. The 'search and rescue' procedure with regards to plants, animals and heritage features must be done, and all sensitive areas with their buffers must be demarcated prior to commencement with construction activities.

Construction

The construction phase is temporary in nature (usually between 12-18 months) with a development footprint for the construction of:

- compounds and laydown areas;

- platforms, or “crane pads”, required to construct the PV panels;
- establishment and laying of foundations for PV panels Mounting system;
- new or upgraded access and internal roads (some roads may be temporary during the construction phase);
- storage areas and site office;
- substation and BESS;
- underground cables to connect the PV panels to the on-site substation;

Even though not a physical construction activity, the construction phase includes the transport of components and equipment to and within the site.

After the construction phase is completed, rehabilitation of temporary construction areas will commence. Any area that does not form part of the operational phase of the project (this can include internal roads and access points) must be rehabilitated as per the rehabilitation plan.

Table 2-2: Project Dimensions

Facility Component	De Rust PV1 SEF
PV area (m ²)	4621329
BESS footprint (m ²)	21500
Temporary laydown areas (m ²)	39720
Onsite Substation (m ²)	23995
Operations and maintenance Building	9980
Internal roads (m ²)	165096
Rehabilitation - 4m of road (m ²)	55032
Total Development Footprint (m ²)	4881620
Total Development Footprint (ha)	488,16
Rehabilitation post-construction (m ²)	104732
Rehabilitation post-construction (ha)	10,47

Operational phase

The operational phase of the SEF has an approximate lifespan of 20 years, and mainly consists of operation and maintenance. All the PV panels will be operational except under circumstances of mechanical breakdown, inclement weather conditions or for maintenance purposes.

Decommissioning

SEF components have an expected end of life, whereby the components need to be dismantled and transported off site, or by replacing the existing infrastructure with the latest technology based on the relevant legislation at the time. Decommissioning requires a temporary laydown area and associated access to accommodate the required equipment and lifting cranes. Prior to the transportation off site, the components need to be evaluated based on reuse, recycle or permanent disposal in accordance with regulatory requirements at that time. The area needs to be rehabilitated based on the rehabilitation plan, by returning the soil, landscape features and vegetation back to its original state prior to the construction phase in order for the land to be used for agricultural purposes again, or as determined by the landowner and competent authorities.



Figure 2-5: Photographs depicting the construction phase of a solar farm similar to De Rust PV1 SEF. Source:

www.power-technology.com, renewablesnow.com

2.4 ALTERNATIVES

2.4.1 Location Alternatives

The location for the proposed De Rust PV 1 SEF was considered based on the following:

- Good Solar resource.
- Relatively flat site, which makes construction easier and less expensive than on an undulating site.
- Distance from existing towns or populated areas (anticipated lower visual, noise and dust impacts).
- Landowners support and favour for the proposed SEF.
- Other REFs have been constructed in the area, and existing transport routes can be utilised;
- The land has a low agricultural potential, lease of the site contributes to landowner and potentially to other profitable agricultural endeavours;

Based on the above, the location of the proposed De Rust PV1 SEF site was selected due to the favourable factors listed above.

2.4.2 Type of Activity Alternative

The Applicant is responding to the growing electricity demand within South Africa, the current infrastructure failure which disrupts sufficient electricity supply, and the increasing pressure on countries to reduce their reliance on fossil fuels, by addressing the need for sustainable renewable energy in the country. The Applicant motivations are towards solar and wind technologies, they cooperate with landowners, technology providers and investors to source and develop renewable energy projects within South Africa.

Other sources of renewable energy, such as Hydropower and Biomass were not considered viable options for the project due to the location of the site. The site is located far from large water bodies for Hydropower and it is also located far from a constant, abundant or sustainable source of Biomass. The site is however located in an area that does have high wind energy potential; accordingly, the Applicant is proposing the development of a commercial SEF and associated infrastructure to add new capacity to the national electricity grid.

2.4.3 Layout Alternatives

Two layout alternatives were considered for the project.

- **Alternative 1 (Preferred Alternative)**

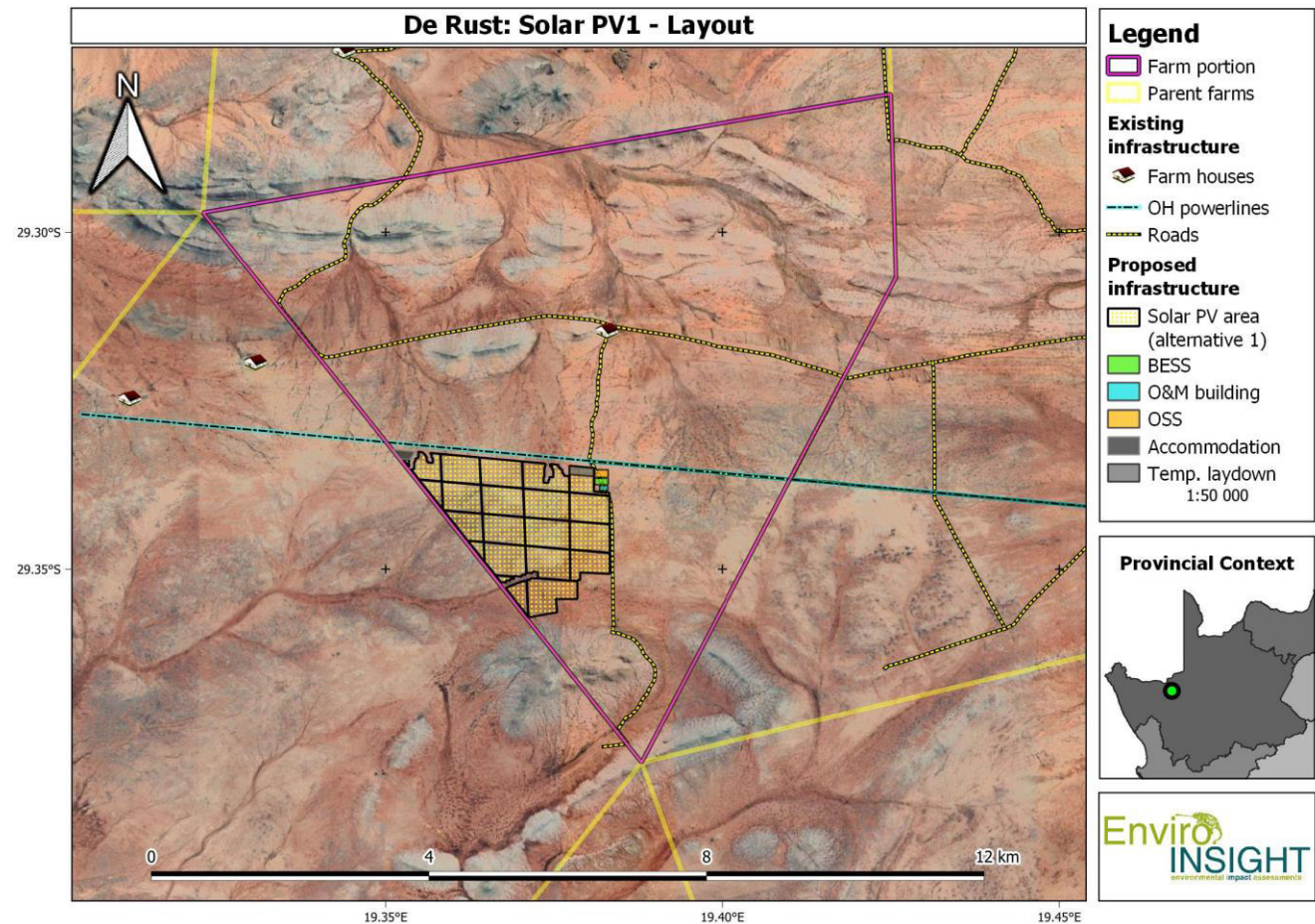


Figure 2-6: Alternative 1.

Table 2-3: Layout Alternative 1 for the proposed De Rust PV1 SEF

FE De Rust Solar PV 1 SEF		
Co-ordinates of the proposed site/s (DDMMSS)	Latitude (S)	Longitude (E)
Point A	29°20'12.01"S	19°21'19.79"E
Point B	29°20'6.63"S	19°23'0.69"E
Point C	29°21'7.54"S	19°23'1.95"E
Point D	29°21'26.38"S	19°22'17.09"E
Mid-Point	29°20'40.31"S	19°22'20.44"E
BESS	29°20'11.46"S	19°22'51.56"E
	29°20'14.92"S	19°22'51.53"E

	29°20'14.91"S	19°22'58.72"E
	29°20'11.38"S	19°22'58.74"E
	approximately 2.13 ha	
Onsite Substation	29°20'6.96"S	19°22'51.47"E
	29°20'11.01"S	19°22'51.59"E
	29°20'11.00"S	19°22'58.74"E
	29°20'6.95"S	19°22'58.68"E
	approximately 2.46 ha	
O&M Building	29°20'15.35"S	19°22'54.20"E
	29°20'18.12"S	19°22'54.24"E
	29°20'18.14"S	19°22'58.51"E
	29°20'15.35"S	19°22'58.46"E
	approximately 1 ha	
Accommodation	29°19'55.99"S	19°21'3.99"E
	29°20'1.20"S	19°21'8.19"E
	29°20'1.22"S	19°21'13.82"E
	29°19'57.16"S	19°21'15.70"E
	3.21ha	
Laydown area	29°20'4.77"S	19°22'38.28"E
	29°20'9.39"S	19°22'38.27"E
	29°20'10.39"S	19°22'51.17"E
	29°20'5.94"S	19°22'51.18"E
	4.98ha	

- **Alternative 2**

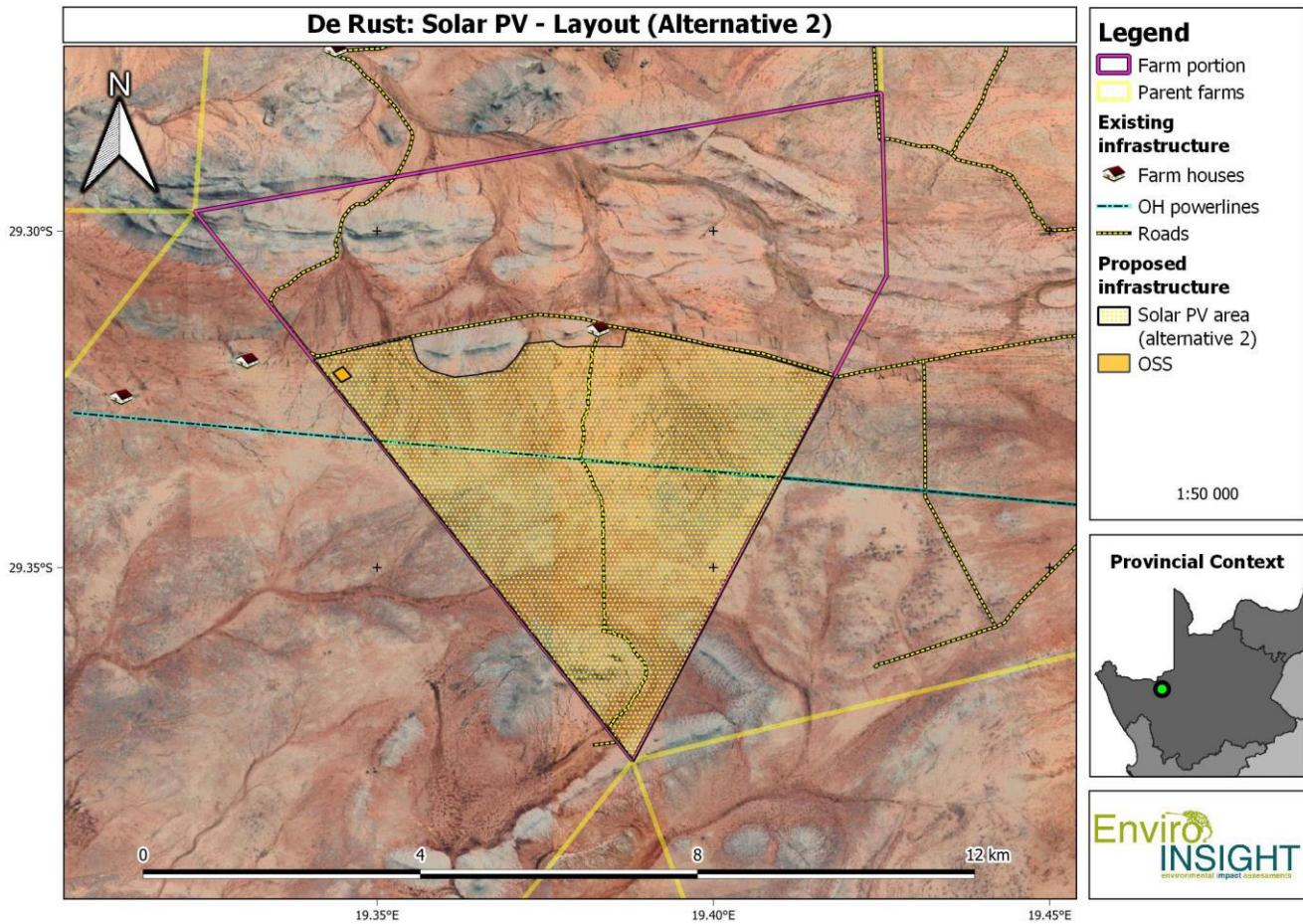


Figure 2-7: Alternative 2

2.4.4 Technology Alternatives

The most important factors that are considered when selecting a solar panels for any site, are the annual average solar coverage. The ongoing monitoring of the solar resource on site will be used to inform the solar panels layout.

Solar Panels

Only the PV solar panel type was considered for the proposed SEF. Due to the limited water resources the proposed project area and the large volume of water required for Concentrated Solar Power (CSP), this technology is not deemed feasible or sustainable and therefore will not be considered. This is the main difference between PV and CSP technology that led to the selection of PV as the preferred solar panel technology. Furthermore, CSP technology requires a larger development footprint to obtain the same energy output as PV technology, and it requires active solar tracking to be effective.

BESS Technology

A Lithium-Ion BESS and Vanadium Redox Flow (VRF) BESS are possible technologies utilised for renewable energy projects.

- Lithium-Ion BESS: Lithium-Ion batteries are sealed systems, these systems are pre-assembled off site and then delivered to site for placement. This BESS system comprises of numerous battery cells that are assembled together to form modules. A module may consist of several cells working in conjunction. Each cell contains a positive electrode, a negative electrode, and an electrolyte. The negative electrode for a lithium-ion cell is typically carbon. The positive electrode can be lithium iron phosphate or a lithium metal oxide. The electrolyte is usually a lithium salt dissolved in an organic solvent.
- Vanadium Redox Flow (VRF) BESS: Redox Flow BESS is a class of electrochemical energy storage devices. The term “redox” refers to chemical reduction and oxidation reactions occur in the in the flow batteries to store energy in liquid electrolyte solutions which flow through a battery of electrochemical cells during charge and discharge. The BESS will be pre-assembled off site, delivered to site for placement and will remain sealed during operations.

No BESS should be located in a sensitive area. Accordingly, the necessary measures need to be put in place to limit potential fires, including a fire break around each De Rust BESS facility (this is a worst-case scenario). If a containerised approach including the usual good practice of separation between containers are applied for this project, the impacts are likely restricted to events to one container at a time, the main risks being close to the containers i.e., to transport drivers, employees at the facilities and first responders to incidents. Should the appropriate preventative measures be applied during the design, transportation and construction phase of the project, both could be considered viable options.

2.4.5 The “No-Go” Alternatives

It is required to consider the “no-go” option in the EIA process. The “no-go” alternative refers to the current status quo and the risks and impacts associated with it. Some existing activities may carry risks and may be undesirable (e.g. an existing contaminated site earmarked for a development). The no-go is the continuation of the existing land use, i.e. maintain the status quo. The ‘No-Go Alternative’ would not assist the government in addressing climate change, energy security and economic development. Implementing this option would also not allow for any beneficial socio-economic and environmental impacts as outlined above.

Based on the above, the ‘No Development’ alternative is not a preferred alternative

2.5 REGIONAL AREA

The proposed development will be located approximately 23 km south of Pofadder, within the Khâi-Ma Local Municipality in the Northern Cape Province. The proposed solar farm can be accessed the via the R358 regional road. The centre point and corner co-ordinates for the development site. The Project has a total footprint of approximately 515ha situated on Portion 1 of the Farm Samoep 147 (21-digit Surveyor General code: C0360000000014700001).

2.6 TOPOGRAPHY

The site has varied terrain, consisting of a relatively flat plain with small quartzite ridges and koppies that form linear hilly regions across the properties, with especially large hills in the southeast, and dolerite outcrops forming small to large conical koppies in the northeast. There are some rocky areas on the flats that are not associated with higher terrain, located in the northern central portion of the PA.

2.7 SPECIALIST STUDIES

Specialist studies were undertaken to address the key issues that require further investigation to address the impacts of the development on the receiving environment. The specialist studies involve the gathering of data relevant to identifying and assessing impacts that may occur as a result of the proposed project. The specialists will also recommend appropriate mitigation or optimisation measures to minimise potential negative impacts or enhance potential benefits, respectively.

A team of highly experienced specialists in order to execute this in a professional and impartial manner. The project team, specifically the sub-consultants, is indicated below:

Table 2-4: Specialist Studies

Specialist Assessment	Company	Professional Specialist
Terrestrial Biodiversity	Enviro-Insight CC	Corné Niemandt Pr.Sci.Nat. Samuel Laurence Pr.Sci.Nat. Alex Rebelo Cand.Sci.Nat.
Sensitive Plant Species	Enviro-Insight CC	Corné Niemandt Pr.Sci.Nat.
Avifauna	Enviro-Insight CC	Samuel Laurence Pr.Sci.Nat. AE Van Wyk Cand.Sci.Nat.
Aquatic Biodiversity	Tate Environmental	Russell Tate Pr.Sci.Nat.
Socio-economic	Independent social sciences consultant	Tony Barbour
Traffic	Innovative Transport Solutions Global	Pieter Arangie
Heritage and Paleontological	HCAC	Jaco van der Walt
Agriculture Compliance Statement	Independent Consultant	Johann Lanz

2.8 SUMMARY OF IMPACTS

The potential impacts associated with the proposed De Rust PV1 SEF and associated infrastructure are summarised below in Table 8-1. Should the mitigation provided in the tables in Section 7 and detailed in the Environmental Management Programme

(EMPr) be implemented, post-migration impacts are anticipated to range between very low to medium negative significance, and up to highly positive.

Table 2-5: Summary of the Impact Assessment

Aspect	Impact	Post Mitigation
Planning and Construction		
Terrestrial Biodiversity	Habitat Loss and Fragmentation	Medium-High
	Loss of species of conservation concern	Low
	Alien and invasive plant species	Low
Avifauna	Increased risk of erosion and flash floods.	Low
	Habitat destruction	Low
	Destruction or disturbance of bird roosts	Low
Aquatic	Operation of equipment and machinery	Low
	Clearing vegetation	Low
	Stockpiling of and placement construction materials	Low
	Excavating/shaping landscape	Low
Agricultural	Final landscaping, backfilling and postconstruction rehabilitation	Low
	Loss of agricultural potential by occupation of land	Medium
	Loss of agricultural potential by soil degradation	Low
	Dust impact	Low
Visual	Enhanced agricultural potential through increased financial security for farming operations	High Positive
	Improved security against stock theft and other crime	High Positive
	Visual intrusion due to the removal of vegetation, movement of construction vehicles and heavy machinery, presence of laydown areas and site clearance	Low
Heritage	Light pollution due to night lighting	Low
	Dust pollution due to site clearance and movement of construction vehicles and heavy machinery	Low
	Disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	Low
Social	Employment, business opportunities and skills development impact rating	Medium Positive
	Construction workers on site and in local area impact rating	Low
	Risk to safety, livestock, and damage to farm infrastructure	Low
	Increased risk of grass fires	Low
Traffic	Nuisance impacts associated with construction related activities	Low
	Increase in traffic volumes on the surrounding road network as a result of construction traffic	Low

	Heavy Loads during the construction phase	Low
General	Stormwater Management	Low
	Hunting / Fishing by construction workers.	Low
	Degradation and contamination of the surrounding environment by construction activities, cement, hydrocarbons and other hazardous materials.	Low
	Potential disturbance or unearthing of graves or disturbance to other heritage resources during the construction phase.	Low
	Improper storage and disposal of solid waste.	Low
	Littering around the site.	Low
	Improper disposal of rubble i.e.: burying or neglecting building rubble resulting in direct mechanical damage to surrounding vegetation and untidiness of the site.	Low
	Lack of toilet facilities resulting in unsanitary conditions.	Low
	Improper disposal of toilet waste from chemical toilets resulting in contamination of the surrounding environment	Low
	Increase waste to landfill site.	Low
	Risk of spills from construction equipment (oils, fuels, cement etc.) contaminating soil and the watercourse.	Low
Dust Generation and control	Low	
Degradation of existing service infrastructure, e.g. roads, electricity.	Low	
Operation		
Terrestrial Biodiversity	Direct faunal impacts due to operation.	Low
	Alien and invasive plant species	Low
Avifauna	Bird mortalities	Low-Medium
	Bird Mortalities powerline and fence collision	Low-Medium
	Disruption of bird migratory pathways	Low-Medium
	The attraction of some bird species	Low-Medium
	Chemical Pollution	Low-Medium
Aquatic	Alteration of drainage	Low
	Alteration of surface water flow dynamics	Low
	Establishment of alien plants on disturbed areas	Low
Visual	Change in visual/landscape character and sense of place due to the presence of the solar and ancillary infrastructure	Medium
	Visual intrusion from the movement of construction vehicles and heavy machinery	Medium
	Light pollution due to night lighting, security lighting and navigational lighting	Medium
	Dust pollution from operation and maintenance vehicles..	Medium

	Light pollution due to night lighting, security lighting and navigational lighting	Medium
	Visual impact on the identified sensitive receptors	Medium
Social	Renewable energy infrastructure and clean renewable energy	High Positive
	Creation of employment and business opportunities	Medium Positive
	Generation of income for landowner	Medium Positive
	Social Economic Development and Enterprise Development	High Positive
	Visual impacts and associated impact on sense of place	Low-Medium
	Impact on property values	Low
	Impact on tourism	Low
Traffic	Increase in traffic volumes on the surrounding road network	Low
Decommissioning		
Terrestrial Biodiversity	The ecological impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts	
Agriculture	Protection of soil resources	Low
Visual	Visual intrusion and dust creation from the movement of construction vehicles and heavy machinery	Low
	Change in landscape character due to the removal of infrastructure	Low
	Light pollution due to night lighting.	Low
	Dust pollution due to infrastructure removal and movement of construction vehicles and heavy machinery.	Low
Social	Social impacts associated with decommissioning	Low
Traffic	Gravel loss and possible damage to the road layer works. as a result of additional truck traffic and heavy load truck traffic during the decommissioning phase	Low

Table 2-6: Summary of Cumulative Impact

Aspect	Impact	Post Mitigation
Planning and Construction		
Terrestrial Biodiversity	Vegetation and habitat loss	Low – Medium
	Increased habitat fragmentation	Low - Medium
	Loss of critical habitat for flora SCC as well as endemic species	Low - Medium
	Loss of provincially protected species which require a permit.	Low - Medium
	Surface water impacts and associated ecological processes.	Low - Medium
	Increased erosion due to flooding (not a yearly event but longer term)	Low - Medium

Aspect	Impact	Post Mitigation
	Increased alien flora and fauna species	Low - Medium
Avifauna	Habitat loss	High
	Road-kills	High
	Powerlines	High
	Regional saturation of solar facilities	High
	Direct Mortality	High
Aquatic	Operation of equipment and machinery	Low
	Clearing vegetation	Low
	Stockpiling of and placement construction materials	Low
	Excavating/shaping landscape	Low
	Final landscaping, backfilling and postconstruction rehabilitation	Low
Agricultural	Regional loss (including by degradation) of future agricultural production potential	Low
Heritage	Increasing as a result of the expansion of renewable energy facilities in the surrounding area	Low
Social	Impact on Sense of Place	Moderate
	Pressure on local services and accommodation	Medium/Low Negative
	Job Creation, Skills Development, training opportunities and creation of downstream business opportunities	High Positive
Visual	Change in visual/landscape character and sense of place, due to the presence of additional renewable energy facilities, from a largely undeveloped landscape to a more industrial type of landscape.	Moderate
	Additional levels of visual intrusion due to the presence of additional renewable energy facilities and from the movement of additional maintenance vehicles and heavy machinery.	Moderate
	Additional dust pollution due to increased traffic.	Moderate
	Additional light pollution due to additional night lighting, security lighting and navigational lighting.	Moderate
	Increased visual impact on the identified sensitive receptors.	Moderate
Traffic	Increase in traffic volumes on the surrounding road network as a result of construction traffic	Low
	Gravel loss and possible damage to the road layer works as a result of additional truck traffic and heavy load truck traffic	Low
Operation		

Aspect	Impact	Post Mitigation
Avifauna	Road-kills	High
	Powerlines	High
Aquatic	Alteration of drainage	Low
	Alteration of surface water flow dynamics	Low
	Establishment of alien plants on disturbed areas	Low
Traffic	Increase in traffic volumes on the surrounding road network during the operational phase.	Low
Decommissioning		
Traffic	Gravel loss and possible damage to the road layer works. as a result of additional truck traffic and heavy load truck traffic during the decommissioning phase	Low
Traffic	Increase in traffic volumes on the surrounding road network during the operational phase.	Low

2.9 SUMMARY OF SPECIALIST OPINIONS AND RECOMMENDATIONS

Table 2-7: Summary of Specialist Recommendations.

Specialist	Recommendation	Opinion
Terrestrial Biodiversity	No fatal flaws are evident for the proposed project should the latest layout be incorporated which has taken sensitivities into account. It is the opinions of the specialists that the project, may be considered for authorisation, on condition all prescribed mitigation measures and supporting recommendations are implemented. Should the layout be amended and significant changes occur which impacts on sensitive features, all necessary protocols need to be followed to ensure all highly sensitive areas are avoided.	Project can proceed with the implementation of the recommended mitigation measures
Avifauna	The presence of nesting and breeding Ludwig's Bustard, Martial Eagles and Red Lark within the PAOI are of particular concern. Avoidance mitigation must be implemented in conjunction with the aforementioned micro siting. Thus, the author will look to support Environmental Authorisation (EA) based upon the following conditions: <ul style="list-style-type: none"> All recommended No-Go buffering must be strictly adhered to; All recommended mitigation measures described above must be applied; The EMPr must be updated every three years in order to reevaluate the potential distributional population changes of species such as Martial Eagles and Vultures. Thus, technological mitigations such as AI, radar and camera technology may have to be re-positioned, re-calibrated and updated. 	Project can proceed with the implementation of the recommended mitigation measures

<p>Aquatic Biodiversity</p>	<p>Considering the type of development proposed, a SEF, and the implementation of the recommendations and mitigation measures, the development is not likely to impact on the FEPA catchment classification associate with the study area.</p>	<p>Project can proceed with the implementation of the recommended mitigation measures</p>
<p>Agriculture</p>	<p>The proposed development will not have substantial negative impact on the agricultural production capability of the site and is therefore acceptable. This is substantiated by the facts that the land is of very low agricultural potential, the amount of agricultural land loss is within the allowable development limits, and that the proposed development poses a low risk in terms of causing soil degradation, if the recommended mitigation measures are implemented.</p>	<p>Project can proceed with the implementation of the recommended mitigation measures</p>
<p>Visual</p>	<p>Overall, the proposed SEF is expected to alter the study areas current sense of place. However, considering the municipality’s objectives and the surrounding approved wind and solar projects, an alteration to the area’s current sense of place is expected. Therefore, the proposed SEF is expected to blend in with the areas future sense of place, which is expected to include additional renewable energy projects. Considering the analysis, including the results of the viewshed and visual exposure analysis, shadow flicker analysis, impact assessments, future land use trends and low density of identified sensitive receptors, the proposed De Rust PV1 SEF project can proceed from a visual and shadow flicker perspective provided that the recommended mitigation measures are adhered to.</p>	<p>Project can proceed with the implementation of the recommended mitigation measures</p>
<p>Heritage</p>	<p>The alternatives are all considered to be acceptable since the infrastructure avoid significant heritage sites and the impact of the proposed project on heritage resources can be mitigated to an acceptable level. The socio-economic benefits also outweigh the possible impacts of the development if the correct mitigation measures are implemented for the project. It is recommended that the proposed project can commence on the condition that the recommendations are implemented as part of the EMPr and based on approval from SAHRA.</p>	<p>Project can proceed with the implementation of the recommended mitigation measures</p>
<p>Social</p>	<p>The development of the proposed SEF will create employment, training and business opportunities during both the construction and operation phases of the project. The potential negative impacts associated with the construction phase can be mitigated. The proposed SEF is an investment in clean, renewable energy infrastructure for the country which will go some way to offset the negative environmental and socio-economic impacts associated with a coal-based fossil fuel energy generation. Renewable energy, including SEF, also addresses climate change and assists the country in meeting climate change reduction goals.</p>	<p>Project can proceed with the implementation of the recommended mitigation measures</p>

	The development of the SEF is supported as the project will have significant positive impacts. These positive impacts relate to the economy by providing clean energy which will reduce South Africa’s carbon footprint.	
Traffic	The existing road network has sufficient spare capacity to accommodate the proposed SEF, without any road upgrades required to the existing road infrastructure. It is recommended that the proposed SEF be approved from a transport impact perspective.	Project can proceed with the implementation of the recommended mitigation measures

2.10 COMPOSITE SENSITIVITY MAP

The combined sensitivity map was based on the findings from all specialist assessments and inputs from all stakeholders. The following relevant features were included, which are considered “no-go” areas (i.e. no development make occur in these areas):

- Avifauna: 1km nest buffers, 200 m buffer around seasonally inundated watercourses
- Watercourses: 40m buffer for Washes and 100m buffer on Depressions
- Plants: 100m buffer around sensitive species

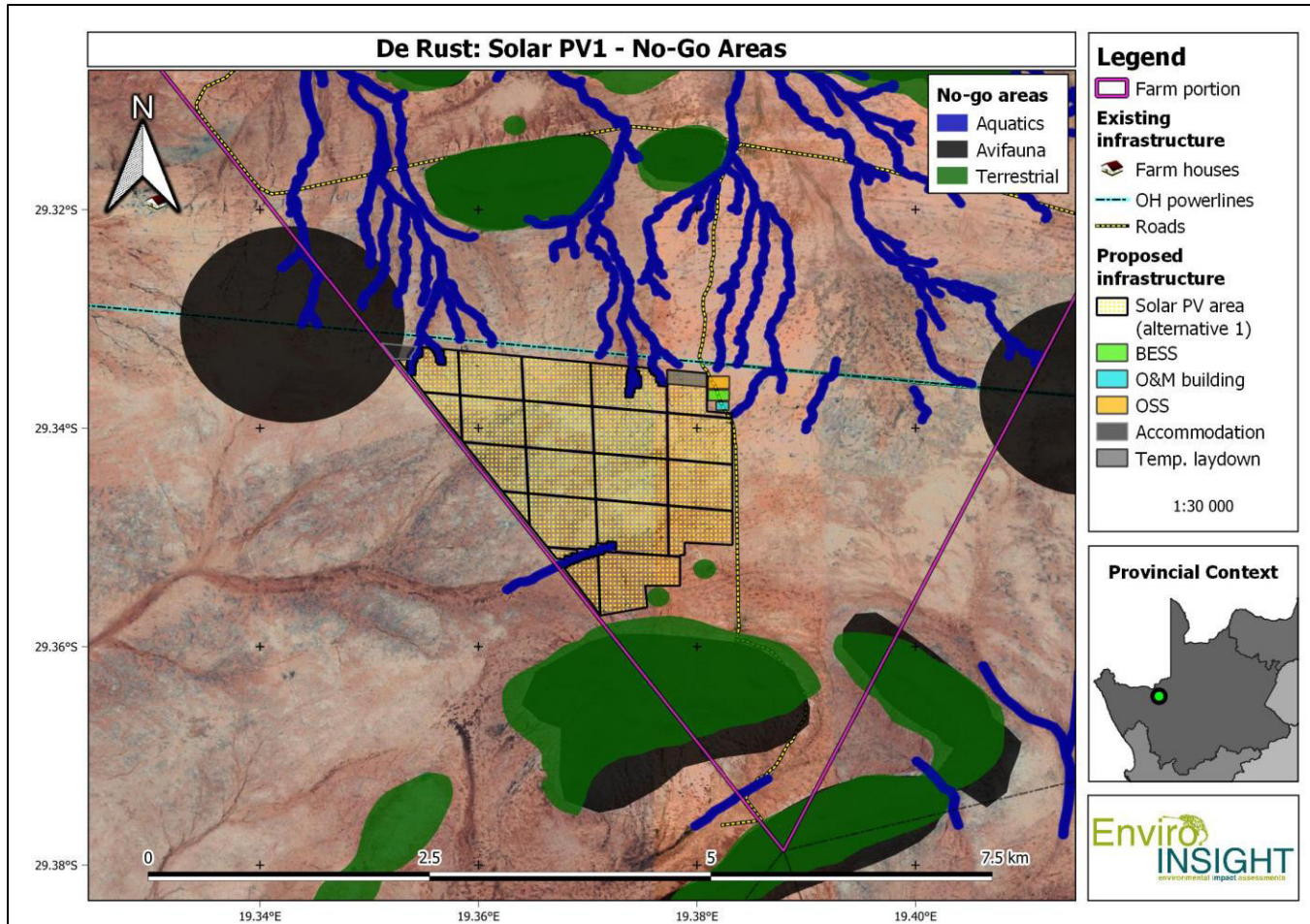


Figure 2-8: Sensitivity analysis indicating high sensitivity areas for the preferred layout

3 IMPACT ASSESSMENT

3.1 METHODOLOGY

Direct, indirect and cumulative impacts of the issues that will be identified during the specialist investigations will be assessed in terms of these standard rating scales to determine their significance. The rating system used for assessing impacts (or when specific impacts cannot be identified, the broader term issue should apply) is based on six criteria, namely:

- **Status** of impacts – determines whether the potential impact is positive (positive gain to the environment), negative (negative impact on the environment), or neutral (i.e. no perceived cost or benefit to the environment). Take note that a positive impact will have a low score value as the impact is considered favourable to the environment;
- **Spatial extent** of impacts – determines the spatial scale of the impact on a scale of localised to global effect. Many impacts are significant only within the immediate vicinity of the site or within the surrounding community, whilst others may be significant at a local or regional level. Potential impact is expressed numerically on a scale of 1 (site-specific) to 5 (global);

- **Duration** of impacts – refers to the length of time that the aspect may cause a change either positively or negatively on the environment. Potential impact is expressed numerically on a scale of 1 (project duration) to 5 (permanent);
- **Frequency of the activity**– The frequency of the activity refers to how regularly the activity takes place. The more frequent an activity, the more potential there is for a related impact to occur.
- **Severity** of impacts – quantifies the impact in terms of the magnitude of the effect on the baseline environment, and includes consideration of the following factors:
 - The reversibility of the impact;
 - The sensitivity of the receptor to the stressor;
 - The impact duration, its permanency and whether it increases or decreases with time;
 - Whether the aspect is controversial or would set a precedent;
 - The threat to environmental and health standards and objectives;
- **Probability** of impacts –quantifies the impact in terms of the likelihood of the impact occurring on a percentage scale of <5% (improbable) to >95% (definite).
- **Confidence** – The degree of confidence in predictions based on available information and specialist knowledge:
 - Low;
 - Medium; or
 - High.

In addition, each impact needs to be assessed in terms of reversibility and irreplaceability as indicated below:

- **Reversibility** of the Impacts - the extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):
 - High reversibility of impacts (impact is highly reversible at end of project life i.e. this is the most favourable assessment for the environment);
 - Moderate reversibility of impacts;
 - Low reversibility of impacts; or
 - Impacts are non-reversible (impact is permanent, i.e. this is the least favourable assessment for the environment).

Determination of Impact Significance

The information presented above in terms of identifying and describing the aspects and impacts is summarised in below in and significance is assigned with supporting rationale.

Table 3-1: Consolidated Table of Aspects and Impacts Scoring

Spatial Scale	Rating	Duration	Rating	Severity	Rating
Activity specific	1	One day to one month	1	Insignificant/non-harmful	1
Area specific	2	One month to one year	2	Small/potentially harmful	2
Whole site/plant/mine	3	One year to ten years	3	Significant/slightly harmful	3
Regional/neighbouring areas	4	Life of operation	4	Great/harmful	4
National	5	Post closure	5	Disastrous/extremely harmful	5

Spatial Scale	Rating	Duration	Rating	Severity	Rating
Frequency of Activity		Rating	Probability of Impact		Rating
Annually / Once-off		1	Almost never/almost impossible		1
6 monthly		2	Very seldom/highly unlikely		2
Monthly		3	Infrequent/unlikely/seldom		3
Weekly		4	Often/regularly/likely/possible		4
Daily / Regularly		5	Daily/highly likely/definitely		5
Significance Rating of Impacts			Timing		
Very Low (1-25)					
Low (26-50)			Pre-construction		
Low – Medium (51-75)			Construction		
Medium – High (76-100)			Operation		
High (101-125)			Decommissioning		
Very High (126-150)					
Adjusted Significance Rating					

The environmental significance rating is an attempt to evaluate the importance of a particular impact, the consequence and likelihood of which is assessed by the relevant specialist. The description and assessment of the aspects and impacts is presented in a consolidated table with the significance of the impact assigned using the process and matrix detailed below.

The sum of the first three criteria (spatial scope, duration and severity) provides a collective score for the consequence of each impact. The sum of the last two criteria (frequency of activity and frequency of impact) determines the likelihood of the impact occurring. The product of consequence and likelihood leads to the assessment of the significance of the impact (Significance = Consequence X Likelihood), shown in the significance matrix below in Table 3-2: Significance Assessment Matrix

Table 3-2: Significance Assessment Matrix

		Consequence (Severity + Spatial Scope + Duration)														
Likelihood (Frequency of Activity + Probability of Impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	

	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 3-3: Positive and Negative Impact Mitigation Ratings.

Colour Code	Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Red	Very High	126-150	Avoidance – consider alternatives	Optimal contribution from Project
Orange	High	101-125	Avoidance as far as possible; implement strict mitigation measures to account for residual impacts	Positive contribution from Project with scope to improve
Yellow	Medium-High	76-100	Where avoidance is not possible, consider strict mitigation measures	Moderate contribution from Project with scope to improve
Light Green	Low-Medium	51-75	Mitigation measures to lower impacts and manage the project impacts appropriately	Improve on mitigation measures
Cyan	Low	26-50	Appropriate mitigation measures to manage the project impacts	Improve on mitigation measures; consider alternatives to improve on
Light Blue	Very Low	1-25	Ensure impacts remain very low	Consider alternatives to improve on

3.2 IDENTIFICATION OF IMPACTS

Potential impacts resulting from the proposed De Rust PV1 SEF were identified during the EIR phase using input from the following sectors:

- Existing information based on literature reviews and desktop assessments (EAP and specialist inputs);
- Site visit with the project team;
- Applicable Guidelines;
- Legislation; and
- Views of interested and affected parties (thus far).

The following potential impacts were identified:

- Socio-economic impacts;
- Sensitive Flora and Fauna;
- Terrestrial Biodiversity / Ecosystem services;
- Aquatic Impact;
- Agricultural;
- Heritage;

- Traffic and Transportation;
- Dust;

3.3 MITIGATION MEASURES

The Impact Mitigation Hierarchy (DEA 2013) will be followed to achieve no overall or limited negative impact on the receiving environment. The Impact Mitigation Hierarchy is a tool which is used reiteratively throughout the project lifecycle to limit negative impacts on the environment. There are four steps/tiers within the hierarchy, and include: Avoid/Prevent, Minimise, Rehabilitate and Offset (Figure 3-1).

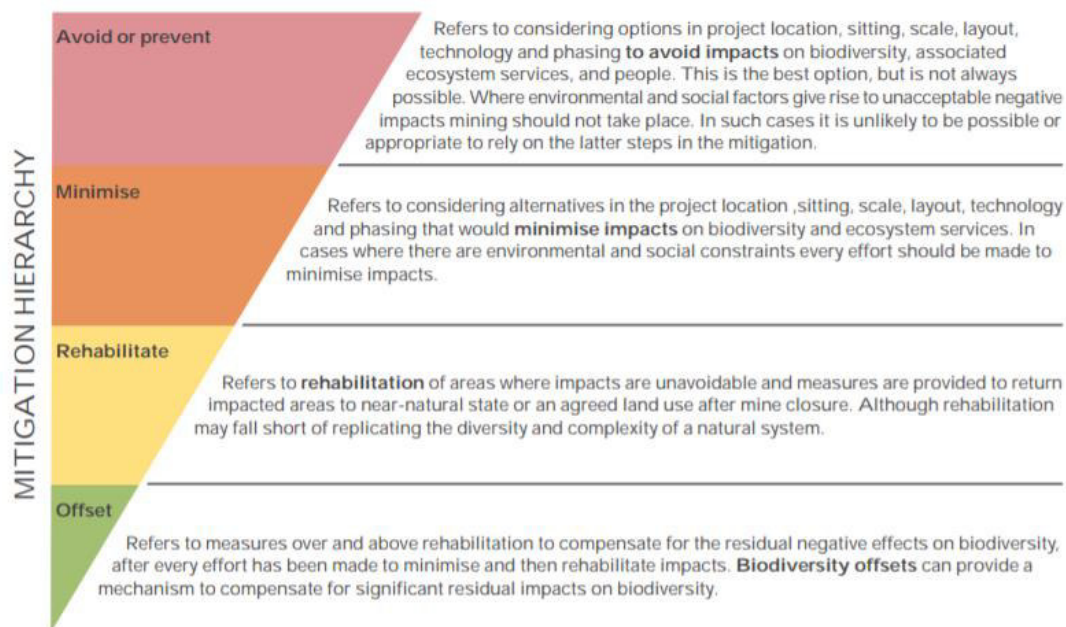


Figure 3-1: The Impact Mitigation Hierarchy (DEA et al., 2013).

Very High impacts should be avoided through alternative layout designs, technology alternatives etc. Where avoidance is not possible, the impacts that are generated by the development should be minimised if measures are implemented in order to reduce the impacts. The proposed mitigation measures should ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development. Where avoidance and/or minimisation are not possible, rehabilitation and possible offset will be considered. These last two options are rarely considered, and should only be done if the first two options could not be met.

3.4 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Table 3-4: Potential Impacts

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
PLANNING & CONSTRUCTION										
Terrestrial Biodiversity										
Habitat Loss and Fragmentation.	Direct	Area specific	Post closure (WoM & WM)	<ul style="list-style-type: none"> • Non-reversible (WoM) • Low (WM) 	<ul style="list-style-type: none"> • Moderate (WoM) • Low (WM) 	Daily/highly likely/definitely	Partial	<ul style="list-style-type: none"> • Ensure that lay-down and other temporary infrastructure is within low and medium sensitivity areas, preferably previously transformed areas if possible. • This impact can also be greatly mitigated if the development in natural 	Often/regularly/likely/possible	Medium-High

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								vegetated areas do not completely remove the existing vegetation and natural cover, with the removal of vegetation to be restricted to the minimum as possible. For the WEFs this is possible, but for the SEFs vegetation clearing and soil disturbance is more significant. Even though species can continue to exist between and		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								underneath PV arrays, the layout of the arrays need to take this into consideration. <ul style="list-style-type: none"> The number of roads should be reduced to the minimum possible and routes should also be adjusted to avoid areas of high sensitivity as far as possible. Where possible, existing roads must be used to avoid additional 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								habitat loss and fragmentation. <ul style="list-style-type: none"> • Movements of machinery, vehicles and persons should be restricted to the existing roads and avoid the existing natural areas. • Solar panels placement can be the cause for the loss of areas with natural vegetation, so care should be taken to limit the placement of solar panels to already 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								disturbed areas or within medium sensitivity areas. <ul style="list-style-type: none"> • Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna. • Rehabilitate disturbed areas that are no longer 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								required by the operational phase of the development. Inadequate rehabilitation could result in limited revegetation and/or an invasion of alien vegetation which will result in long term ecological degradation and damage. <ul style="list-style-type: none"> • Temporary infrastructure will be rehabilitated post- 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								construction as these sections were only required during the construction phase. This includes laydown areas and the widening of internal roads. <ul style="list-style-type: none"> • A Rehabilitation Management Plan must be developed and implemented during the construction phase as construction is complete at each site. 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> An Environmental Control Officer (ECO) must be employed to monitor the clearing of vegetation for the construction of roads and hardstands. 		
Loss of species of conservation concern.	Direct	Activity specific	<ul style="list-style-type: none"> Post closure WoM One year to ten years WM 	Non-reversible (WoM) • Moderate (WM)	<ul style="list-style-type: none"> High (WoM) Low (WM) 	Infrequent/unlikely/seldom	Yes	<ul style="list-style-type: none"> Sensitive species 144 needs to be protected in situ and requires a 200m buffer for WEF and 100m buffer for SEF. Three data deficient species were recorded 	Very seldom/highly unlikely	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								on site. Even though no specific buffers are required as per the SEA Guidelines (SANBI 2020), D. vanzylli and A. diabolicus should ideally be protected in situ and accordingly the layout should avoid the habitats where these species occur. Hoodia gordonii can be relocated and require a permit from the provincial government.		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> A comprehensive Plant Search and Rescue must be undertaken by a suitably qualified botanical specialist prior to vegetation clearance. This is applicable for provincially protected species which could be removed from site with the relevant permit. Avoidance of drainage lines is necessary for the protection of 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								suitable habitat for sensitive species 12. <ul style="list-style-type: none"> • All relevant plant permits must be obtained from the provincial authority prior to the removal or relocation of SCC, including provincially protected species. • Plant SCC found within the proposed site must either be housed in an onsite nursery for use during rehabilitation or 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								be relocated to suitable areas where vegetation clearance will not occur.		
Alien and invasive plant species	Direct	Whole site/plant/mine (WoM) Area specific (WM)	One year to ten years (WoM & WM)	Low (WoM) Moderate (WM)	Moderate (WoM) Low (WM)	Infrequent/unlikely/seldom (WoM)	Yes	<ul style="list-style-type: none"> A site-specific Alien Invasive Species (AIS) Management Plan must be implemented during the construction phase and continued monitoring and eradication needs to take place throughout the life of the project. Alien vegetation, within the development 	Very seldom/highly unlikely	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								footprints, should be removed from the site and disposed of at a registered waste disposal site. <ul style="list-style-type: none"> The development footprints and immediate surroundings should be monitored for the growth/regrowth of alien vegetation throughout the construction and operation phases of the project. 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Increased risk of erosion and flash floods.	Direct and Indirect	Area specific	Post closure (WoM&WM)	Low (WoM) Moderate (WM)	Moderate (WoM) Low (WM)	Infrequent/unlikely/seldom	Yes	<ul style="list-style-type: none"> Soil erosion and Rehabilitation Plan to be part of the EMPr. The clearance of vegetation, at any given time, must be kept to a minimum to reduce the possibility of soil erosion. Rehabilitation of eroded areas on a regular basis during the construction period. All roads and other hardened surfaces 	Very seldom/highly unlikely	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. <ul style="list-style-type: none"> Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. Ground clearing and the digging of trenches 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								should ideally take place at the end of the dry season, prior to the first rains in order to minimise the impacts of dust. <ul style="list-style-type: none"> Newly cleared and exposed areas must be managed for dust and landscaped with indigenous vegetation to avoid soil erosion. Where necessary, temporary stabilisation measures must be used 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								until vegetation establishes. <ul style="list-style-type: none"> • Avoid the presence of people and vehicles in highly sensitive areas, including riverine areas and natural vegetation, as far as possible. • Stormwater management plan is required. • Avoid construction within watercourses, and where roads crossing occur, the 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								appropriate mitigation measures as indicated by the aquatic specialist must be implemented.		
Avifauna										
Habitat destruction	Direct	Regional/neighbouring areas (WoM) Activity specific (WM)	One year to ten years (WoM) One month to one year (WM)	Medium (WoM) Low (WM)	No	Daily/highly likely/definitely	Yes	Impacts associated with the loss of bird foraging habitat due to operations can be mitigated by avoiding avifaunal specific sensitive areas and their associated buffers, such as the local drainage lines, impoundments, smaller watercourses, and pans. A	Often/regularly/likely/possible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								green buffer should be maintained around all habitats with a SEI designated as High or above. Apply necessary buffers for roost and foraging sites and other sensitive bird habitat features, avoiding the construction of infrastructure and access roads in these areas. Roads must utilise or upgrade existing farm roads as far as possible.		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Destruction or disturbance of bird roosts	Direct	Area specific (WoM) Activity specific (WM)	One year to ten years (WoM&WM)	Yes (WoM & WM)	Potentially (WoM) No (WM)	Daily/highly likely/definitely	Yes	Apply necessary buffers for roost sites and other sensitive bird habitat features, avoiding the construction of infrastructure and access roads in these areas. Roads must utilise or upgrade existing farm roads as far as possible.	Infrequent/unlikely/seldom	Low
Aquatic										
Operation of equipment and machinery	Direct	Activity specific	One year to ten years (WoM)	-	-	Often/regularly/likely/possible	Yes	All contractors and staff are to be familiarised with the method statement and	Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
			Short Term (WM)					have undergone an induction / training on the location of sensitive No-Go areas and basic environmental awareness using the mitigation provided in this report.		
Clearing vegetation	Direct	Activity specific	One year to ten years (WoM) Short Term (WM)	-	-	Often/regularly/likely/possible	Yes	• Access routes into or adjacent to the washes must make use of existing road ways and crossings where possible;	Almost never/almost impossible	Low
Stockpiling of and placement construction materials	Direct		One year to ten years (WoM) Short Term (WM)	-	-	Often/regularly/likely/possible	Yes		Almost never/almost impossible	Low
Excavating/shaping landscape	Direct	Activity specific	One year to ten years (WoM)	-	-	Often/regularly/likely/possible	Yes		Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Final landscaping, backfilling and postconstruction rehabilitation	Direct	Activity specific	One year to ten years (WoM)	-	-	Often/regularly/likely/possible	Yes	<ul style="list-style-type: none"> • Areas where construction is to take place must be clearly demarcated. Any areas not demarcated must be avoided; • Storm-water generated from roadways must be captured and buffered, where flow velocities are to be significantly reduced before discharge into the environment. • Storm-water verges as well as other denuded areas must be grassed 	Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								(revegetated) with local indigenous grasses to protect against erosion; <ul style="list-style-type: none"> Any materials excavated must not be deposited in the river channel or valley slopes where it is prone to being washed downstream or impeding natural flow; The installation of sedimentation/erosion protection measures must be implemented before the start of construction, e.g., several rows of silt traps 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								and fences (this is particularly important in the access roads leading or adjacent to the watercourse); <ul style="list-style-type: none"> • Stockpiling or storage of materials and/or waste must be placed beyond the defined buffers in this report for each respective activity; • No vehicles shall enter watercourse buffer zones outside of construction footprints; 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> • No vehicles shall be serviced on site; a suitable workshop with appropriate pollution control facilities should be utilised offsite; • Hydrocarbons for refuelling purposes must be stored in a suitable storage device on an impermeable surface outside of the delineated wetland buffer zone; • Disturbed areas must be re-vegetated after completion of the phase; 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> o A one-month timeframe for the initiation of this action; o Ripping of the soils should occur in two directions; and o Removed vegetation and topsoil can be harvested and applied here. • Drainage channels constructed for the access roads must be constructed so as not to result in erosion; • An inspection of the drainage channels must be completed within 1 month 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								following the end of activities and within a month after the first rainfall event which exceeds 5mm. Should excessive sediment be transported down the channels it is recommended that sediment screens are implemented; <ul style="list-style-type: none"> An alien vegetation removal and management plan must be implemented along the verges of the roads and crossing points; 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> • General storm-water management practices should be included in the design phase and implemented during the construction phase of this project; and • Following the completion of the phase, all construction materials and debris should be removed and disposed of in a suitable off-site area. An inspection 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								should be completed within a week after the phase is completed. <ul style="list-style-type: none"> • The implementation of the buffer zone stipulated in this report; • Clean and dirty surface water separation and a storm-water management plan must be put into place via standard best practice methods; • A clear storm-water management plan for hardened surfaces must be 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								implemented; <ul style="list-style-type: none"> The revegetation of disturbed non-active cleared areas must take place within the first growing season between September and March following completion of the activity; The above must be audited within 3 months of completing the phase; No discharge of domestic water must occur if possible. Domestic water must be reused for dust suppression. 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> All stockpiles and hazardous waste storage areas must be bunded by either a cut-off trench or berm directed to a Pollution Control Dam inline with best practice surface water management guidelines. 		
Agricultural										
Loss of agricultural potential by occupation of land	Direct	Local	Long term (WoM)	-	-	High	Yes	Increased financial security for farming operations by the leasing of the property	Medium	Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Loss of agricultural potential by soil degradation	Direct	Local	Medium term (WoM) Short Term (WM)	-	-	Medium	Yes	<ul style="list-style-type: none"> Design an effective system of storm water runoff control, where it is required that is at any points where runoff water might accumulate. The system must effectively collect and safely disseminate any runoff water from all accumulation points and it must prevent any potential down slope erosion. 	Low	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> • Maintain where possible all vegetation cover and facilitate revegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. • If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								respreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.		
Dust impact	Direct	Local	Medium term (WoM) Short Term (WM)	-	-	Medium	Yes	Implement dust control measure	Low	Low
Enhanced agricultural potential through	Positive Impact									

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
increased financial security for farming operations										
Improved security against stock theft and other crime	Positive Impact									
Visual										
Visual intrusion due to the removal of vegetation, movement of	Direct	Whole site (WoM) Area specific (WM)	One month to one year (WoM & WM)	-	-	Significant / slightly harmful	Yes	• Limit the construction footprint to only the development area.	Small / potentially harmful	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
construction vehicles and heavy machinery, presence of laydown areas and site clearance								<ul style="list-style-type: none"> • Ensure ongoing housekeeping. • Carefully plan to minimize the construction duration. • Inform receptors of the construction programme and schedule. • Regulate the speed of vehicles on and off site. 		
Light pollution due to night lighting	Direct	Local	-	-	-	Highly probable	Yes	<ul style="list-style-type: none"> • Use existing roads where possible. 	Highly probable	Low
Dust pollution due to site clearance and movement of	Direct	Local	-	-	-	Highly probable	Yes	<ul style="list-style-type: none"> • Limit the number of construction vehicles travelling to and from site. 	Highly probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
construction vehicles and heavy machinery								<ul style="list-style-type: none"> • Implement dust suppression activities. • Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. • Remove vegetation in a phased manner. • Choose lighting types that reduce spill light and glare. • Only focus light where it is needed. 		
Heritage										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	Direct	Local	Permanent (WoM&WM)	Not reversible	Yes	Improbable	N/A	<ul style="list-style-type: none"> Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources in case heritage resources are uncovered during the course of construction; Any changes to the layout should be subjected to a heritage 	Improbable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								walkdown prior to development.		
Social										
Employment, business opportunities and skills development	Direct and Cumulative	Local (WoM&WM)	Short term (WoM) (WM)	-	-	Highly probable	Yes	<ul style="list-style-type: none"> Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to 	Highly probable	Medium Positive

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								be filled by people from outside the area. <ul style="list-style-type: none"> • Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. • Before the construction phase commences the proponent should meet with representatives from the NKM to establish the existence of a skills 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase. <ul style="list-style-type: none"> The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project. <ul style="list-style-type: none"> • Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. • The recruitment selection process should seek to 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								promote gender equality and the employment of women wherever possible. • The proponent should liaise with the NKM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection		

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			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.		
Construction workers on site and in local area	Direct	Local (WoM&WM)	Short term for community as a	No in case of HIV and AIDS	Yes, if people contract HIV/AIDS.	Probable	Yes	<ul style="list-style-type: none"> Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for 	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
			whole (WoM) (WM)		Human capital plays a critical role in communities that rely on farming for their livelihoods			construction jobs, specifically for semi and low skilled job categories. The proponent and the contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								dismissed. All dismissals must comply with the South African labour legislation. <ul style="list-style-type: none"> • The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase. • The contractor should provide transport for workers to and from the site on a daily basis. This 		

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			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site. <ul style="list-style-type: none"> • The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end. • No construction workers, with the exception of 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								security personnel, should be permitted to stay over-night on the site.		
Risk to safety, livestock, and damage to farm infrastructure	Direct	Local (WoM&WM)	Short term (WoM&WM)	Yes, compensation paid for stock losses and damage to farm infrastructure etc.	No	Probable	Yes	<ul style="list-style-type: none"> The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the 	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								construction phase commences. <ul style="list-style-type: none"> • All farm gates must be closed after passing through. • Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. • The proponent should consider the option of establishing a MF (see above) that includes local 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site. <ul style="list-style-type: none"> The proponent should hold contractors liable for 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								caused by construction workers or construction related activities (see below). <ul style="list-style-type: none"> The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. Contractors appointed by the proponent must ensure that all workers 		

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			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. <ul style="list-style-type: none"> Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation. <ul style="list-style-type: none"> It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site. 		
Increased risk of grass fires	Direct	Local (WoM&WM)	Short term (WoM&WM)	Yes, compensation paid for	No	Probable	Yes	<ul style="list-style-type: none"> The proponent should enter into an agreement with the local farmers in 	Probable	Low

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
				stock and crop losses etc.				the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. <ul style="list-style-type: none"> Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> Smoking on site should be confined to designated areas. Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy winter months. <ul style="list-style-type: none"> • Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. • Contractor should provide fire-fighting training to selected construction staff. 		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> No construction staff, with the exception of security staff, to be accommodated on site overnight. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The 		

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			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		
Nuisance impacts associated with construction related activities	Direct	Local (WoM&WM)	Short Term (WoM&WM)	Yes	No	Probable	Yes	<ul style="list-style-type: none"> The movement of construction vehicles on the site should be confined to agreed access road/s. Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective 	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. The movement of heavy vehicles associated with the construction phase should be timed to avoid times days of the week, such as weekends, when the volume of traffic travelling along the		

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								access roads may be higher. • Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. • Dust suppression measures should be		

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								implemented, such as wetting on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. <ul style="list-style-type: none"> All vehicles must be road worthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. 		
Traffic										

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				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Increase in traffic volumes on the surrounding road network as a result of construction traffic	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	<ul style="list-style-type: none"> Construction traffic should not be allowed on the public road network during the typical weekday a.m. and p.m. peak hours in built up areas. These measures will be included in the Transport Management Plan 	Probable	Low
Gravel loss and possible damage to the road layer works. as a	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	<ul style="list-style-type: none"> Resurfacing of sections along the R358, where required and regular road maintenance i.e. grading of the road 	Probable	Low

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result of additional truck traffic and heavy load truck traffic								once every two weeks during the construction phase. • The road can also be sprayed with water (grey water if available) once a day to limit dust pollution and gravel loss.		
General										
Stormwater Management	Indirect	Local	Construction	Yes – can be prevented/managed	No	Medium	High	Vegetation maintenance: regular watering, weed control, replacement of dead plants, pest monitoring and control and dirt removal.	Low	Low

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								Vegetation maintenance should occur bi-weekly. Maintenance of infrastructure such as concrete pipe and channels as well as grids and kerb inlets should occur monthly.		
Hunting / Fishing by construction workers.	Direct	Local	Construction phase (short-term)	Yes – can be prevented	No	Medium - Low	High	Hunting / poaching and fishing are prohibited. During construction, guidelines set out by the ECO will be followed to ensure no potential impacts occur and workers will be instructed that hunting and	Low	Low

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								fishing is a non-compliance of the authorized activity.		
Degradation and contamination of the surrounding environment by construction activities, cement, hydrocarbons and other hazardous materials.	Direct	Local/ regional	Construction phase (short-term)	Yes – can be managed/prevented	No	High	High	Site workers will be trained in avoiding impacts in areas of potential concern. Designated concrete mixing areas and storage areas for any hazardous materials must be assigned; cement mixing is not permitted in any area where runoff can contaminate the surrounding environment. This must be strictly	Low	Low

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								controlled through the site specific EMPr.		
Potential disturbance or unearthing of graves or disturbance to other heritage resources during the construction phase.	Direct	Local/ regional	Construction phase (short-term)	Yes – can be managed/prevented	No	Low	Low	There is no evidence of any heritage resources. If any resources are discovered during construction, the ECO must be notified immediately and construction around the resource must cease immediately. This must be strictly monitored by the ECO and controlled through the EMPr.	Low	Low

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Improper storage and disposal of solid waste.	Direct	Local/ regional	Construction phase (short-term)	Yes – can be managed/prevented	No	High	High	Due to the nature of the activity, waste is anticipated to be minimal. All solid waste generated during the construction process must be placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site, be accessible by animals, or be placed in piles adjacent to the skips / bins. All solid waste must then be disposed of at the nearest	Low	Low

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								licensed landfill and safe disposal certificates must be obtained and kept on site at all times during construction. Separate skips/ bins for the different waste streams must be available on site. The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered.		

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Littering around the site.	Direct	Local	Construction & Operation phase (short-term)	Yes – can be prevented	No	Medium - Low	High	Littering is not permitted on the site and general housekeeping must be enforced. General waste bins must be readily available for litter disposal and general housekeeping.	Low	Low
Improper disposal of rubble i.e.: burying or neglecting building rubble resulting in direct	Direct	Local (within construction site)	Construction phase (short-term)	Yes impact can be managed	No	Medium	High	All excess material and rubble must be removed from the site so not to restrict the rehabilitation process. All excess material and rubble must go to an approved designated landfill and a safe disposal	Low	Low

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mechanical damage to surrounding vegetation and untidiness of the site.								certificate must be obtained. Site workers will be trained in avoiding such impacts during induction training and regular toolbox talks.		
Lack of toilet facilities resulting in unsanitary conditions.	Direct	Local	Construction & Operation phase (short-term)	Yes – can be prevented	No	High	High	Adequate toilet facilities must be provided for all staff members as standard construction practice as well as during operational activities. Chemical toilets, if used, must be secured to the ground and kept away from any sensitive areas. It	Low	Low

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								should be regularly cleaned by a reputable company and maintained in a clean state. During operation toilet facilities provided by the venue must be used by staff and guests. This must be monitored in an EMP.		
Improper disposal of toilet waste from chemical toilets resulting in contamination of the	Indirect	Local	Construction phase (short-term)	Yes – can be prevented	No	High	High	Chemical toilets must be placed onsite and not in close proximity to any sensitive areas. The chemical toilets must be provided by a registered company and all effluent	Low	Low

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surrounding environment								must be regularly disposed of at a licenses facility. Safe disposal certificates must be obtained and kept on site.		
Increase waste to landfill site.	Indirect	Local	Construction & Operation phase (short-term)	Yes – can be managed	No	High	Medium	Due to the nature of the activity during construction and operational phases, waste is anticipated to be minimal. Where possible, waste streams will be separated and recycled to limit the amount of waste being added to the landfill site.	Medium	Low

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Risk of spills from construction equipment (oils, fuels, cement etc.) contaminating soil and the watercourse.	Direct	Local (within construction site)	Construction phase (short-term)	Yes impact can be managed	No	Medium	High	Any hazardous or dangerous goods utilised during the construction phase must be stored on an impermeable surface that is bunded, fenced, locked and covered. A spill kit must be clearly marked and visible when utilizing hazardous or dangerous materials to ensure that all spills are immediately cleaned. Spill kits must be regularly checked and maintained.	Low	Low

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Dust Generation and control	Direct	Local	Construction & Operation phase	Yes impact can be managed	No	Medium	High	<ul style="list-style-type: none"> The Developer and construction contractors must take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the ECO and the relevant regulatory authorities; Removal of vegetation must be avoided until such time as soil stripping is required, and similarly exposed surfaces must 	Low	Low

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								be re-vegetated or stabilised as soon as is practically possible; • Appropriate dust suppression measures must be used when dust generation is unavoidable, e.g. damping down of all exposed soil surfaces with a water bowser or hosepipe when necessary; • To reduce dust dampening with water,		

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			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								particularly during prolonged periods of dry weather appropriate chemical binders may be used. Such measures must also include the use of temporary stabilising measures (e.g. chemical soil binders, straw, brush packs, chipping etc.); <ul style="list-style-type: none"> • During high wind conditions, the Contractor during construction and the developer during operation, must evaluate 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; <ul style="list-style-type: none"> Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid sand 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								and dust drifting into neighbouring areas; <ul style="list-style-type: none"> The dust monitoring programme as per the National Dust Control Regulations, will be implemented and the necessary steps taken to ensure compliance with the relevant quality requirements; and A complaints register will be implemented and any complaints related to dust will be investigated and 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								appropriate measures taken to resolve the issue.		
Degradation of existing service infrastructure, e.g. roads, electricity.	Direct	Local	Construction phase (short-term).	Yes impact can be managed	No	High	High	Any damage to existing infrastructure will result in the reinstating of that infrastructure to an acceptable state. The cost of which will be that of the applicant. The site currently is not dependent on municipal services.	Low	Low
OPERATION										
Terrestrial Biodiversity										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Direct faunal impacts due to operation.	Direct	Area specific	Life of operation One year to ten years (WoM) WM)	Low (WoM) Moderate (WM)	Moderate (WoM) Low (WM)	Infrequent/unlikely/seldom	Yes	<ul style="list-style-type: none"> reduce exterior lighting to that necessary for safe operation and implement operational strategies to reduce spill light. Use down-lighting from non-UV lights where possible, as light emitted at one wavelength has a low level of attraction to insects. This will reduce the likelihood of attracting insects and their predators. 	Infrequent/unlikely/seldom	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> illegal collection, hunting or harvesting of any plants or animals at the site by contractors should be strictly forbidden except by individuals (Project developer, Manager or ECO) with the appropriate permits, all hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill, <ul style="list-style-type: none"> • driving should be limited to an acceptable speed limit by all employees and contractors, such as 40 km, to reduce collisions with fauna, • road kills need to be monitored and if required, a roadkill monitoring programme (inclusive of 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								wildlife collisions record keeping) should be established. Where needed, Animex fences must be installed to direct animals to safe road crossings. Finally, mitigation should be adaptable to the onsite situation which may vary over time. <ul style="list-style-type: none"> • reduce direct mortalities by allowing for fauna to cross the roads. Where applicable, this can be 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								achieved by constructing fauna underpasses under the roads (large culverts or large open-ended concrete pipes laid into the raised roads). These underpasses should be used in conjunction with "fauna barriers" which prevent the most susceptible small fauna from crossing the roads on the surface by directing them towards the underpasses where		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								they can cross under the roads safely. It is important to note that utilization of underpasses is strongly dependent on animal body size (larger culverts are more successful) and the surrounding habitat. <ul style="list-style-type: none"> all staff operating motor vehicles must undergo an environmental induction training course that includes instruction on the need to comply with 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								speed limits, to respect all forms of wildlife and, wherever possible, prevent accidental road kills of fauna. Drivers not complying with speed limits should be subject to penalties. <ul style="list-style-type: none"> all potential pitfalls (trenches, excavations) must have escape points with an angle of less than 45° to allow for trapped animals to escape. 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> fences should be constructed in such a way so that burrowing animals can still gain access, which will allow other animals to also utilise the holes dug under fences to increase connectivity in the area. Fences should have mesh size large enough to allow small animals to pass through, if not (e.g. EasyView), regular holes must be cut at the base to allow 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								movement of these animals.		
Alien and invasive plant species	Direct	Whole Site (WoM) Area specific (WM)	Post Closure (WoM&WM)	Low (WoM) Moderate (WM)	Moderate (WoM) Low (WM)	Infrequent/unlikely/seldom	Yes	<ul style="list-style-type: none"> The site-specific AIS Management Plan must be implemented for the first year of the operational phase. Thereafter, alien vegetation must continue to be monitored and eradicated annually throughout the life of the project. Due to the disturbance at the site as well as the increased runoff generated 	Very seldom/highly unlikely	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as Prosopis are already present in the area and are likely to increase rapidly if not controlled. <ul style="list-style-type: none"> Regular alien clearing should be conducted using the best-practice methods for the species concerned. 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								The use of herbicides should be avoided as far as possible. • Alien vegetation, within the development footprints, should be removed from the site and disposed of at a registered waste disposal site.		
BESS Impacts	-	-	-	-	-	-	-	• No BESS should be located in a sensitive area; • Employ Fire Mitigation Measure, Emergency Spill Kits should be present onsite at all times	-	-

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Avifauna										
Bird mortalities	Direct	Regional/neighbouring areas	Life of operation (WoM&WM)	No	Yes (WoM) Potentially (WM)	Often/regularly/likely/possible	Yes	• Avoid placement of infrastructure near sensitive bird breeding and roosting habitats. The application of adaptive mitigation measures (e.g., shutdown on demand retrofitting), according to post-construction monitoring results (counted strikes of threatened species) must be informed by environmental correlates of avifaunal activity and/or	Infrequent/unlikely/seldom	Low- Medium
Bird Mortalities powerline and fence collision		Whole site/plant/mine	Life of operation	No (WoM & WM)	Yes (WoM) Potentially (WM)	Daily/highly likely/definitely (WoM)	Yes		Infrequent/unlikely/seldom	Low- Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<p>strikes. It is vital to understand that significant bird mortality for ground dwelling species such as Ludwig's Bustard and Karoo Korhaan will occur, as a result of collision with supporting infrastructure. Therefore, mitigation measures must be applied to powerlines and fences.</p> <ul style="list-style-type: none"> Application of a contingency-based shutdown on demand for collision Impacts on High 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								value target species such as Vultures, Ludwig's Bustard and Martial Eagle <ul style="list-style-type: none"> • Lighting to be kept to a minimum • Post Construction Monitoring • Where service road intersect with semi natural or natural habitat, all fences must be set back at least (strictly) 75 metres from the edge of every service road in order to allow for vulnerable species such as 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								cranes and korhaans to obtain adequate height after being flushed by vehicle traffic. Alternatively, the fences must be placed completely adjacent to the roads with a maximum of 3 metres buffer and marked with fence flappers in order to reduce flush related collisions.		
Disruption of bird migratory pathways	Indirect	Regional/neighbouring areas	Life of operation (WoM & WM)	No (WoM) Yes (WM)	Yes (WoM) No (WM)	Daily/highly likely/definitely	Yes	The linear drainage line habitats must be buffered by a minimum of 50 metres	Very seldom/highly unlikely	Low-Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								from the edge of the demarcated wetland.		
The attraction of some bird species	Indirect	Regional/neighbouring areas (WoM) Whole site/plant/mine (WM)	Life of operation (WoM & WM)	No (WoM) Yes (WM)	Yes (WoM) No (WM)	Daily/highly likely/definitely	Yes	The application of strict chemical control protocols as per the EMPR.	Very seldom/highly unlikely	Low-Medium
Chemical pollution	Indirect	Regional/neighbouring areas (WoM)	Life of operation (WoM & WM)	No (WoM) Yes (WM)	Yes (WoM) No (WM)	Daily/highly likely/definitely	Yes	The application of strict chemical control protocols as per the EMPR.	Infrequent/unlikely/seldom	Low-Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
		Whole site/plant/mine (WM)								
Aquatic										
Alteration of drainage	Direct	Activity specific (WoM & WM)	Life of operation (WoM) Long Term (WM)	-	-	Often/regularly/likely/possible	Yes	<ul style="list-style-type: none"> The implementation of the buffer zones provided in this report; Clean and dirty surface water separation and storm-water management plan must be put into place via standard best practice methods; An effective storm-water 	Almost never/almost impossible	Low
Alteration of surface water flow dynamics	Direct	Activity specific (WoM & WM)	Life of operation (WoM) Short Term (WM)	-	-	Often/regularly/likely/possible	Yes	<ul style="list-style-type: none"> An effective storm-water 	Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Establishment of alien plants on disturbed areas	Direct	Activity specific (WoM & WM)	Life of operation (WoM)	-	-	Often/regularly/likely/possible		management plan for infrastructure must be implemented; <ul style="list-style-type: none"> The revegetation of disturbed non active cleared areas must take place within 1 month of completing the construction phase; The above must be audited within 3 months of completing the phase; No discharge of domestic water must occur if possible. Domestic water must be reused for dust suppression. 	Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								Should domestic water be required to be discharge, the management of nitrogen concentrations is imperative. • All stockpiles and hazardous waste storage areas must be bunded by either a cut-off trench directed to a Pollution Control Dam or via a berm.		
Visual										
Change in visual/landscape character and	Direct	Regional / neighbouring areas (5	Life of the activity (long	-	-	Great / harmful	Yes management measures	• Retain and maintain natural vegetation	Significant / slightly harmful	Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
sense of place due to the presence of the infrastructure and ancillary infrastructure		km to 50 km (WoM&WM)	term) (WoM&WM)				can be implemented.	within and around the development footprint where possible. <ul style="list-style-type: none"> Natural colours should be used on ancillary infrastructure so that they blend into the surrounding landscape. 		
Visual intrusion from the infrastructure dominating the skyline in a largely natural area	Direct	Regional / neighbouring areas (5 km to 50 km) (WoM&WM)	Life of the activity (long term) (WoM&WM)	-	-	Great / harmful	Yes management measures can be implemented.	they blend into the surrounding landscape. <ul style="list-style-type: none"> Non-reflective surfaces should be utilized where possible. Implement dust 	Significant / slightly harmful	Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Visual intrusion from the movement of construction vehicles and heavy machinery	Direct	Regional / neighbouring areas (5 km to 50 km) (WoM&WM)	Life of the activity (long term) (WoM&WM)	-	-	Great / harmful	Yes management measures can be implemented.	suppression activities. <ul style="list-style-type: none"> All infrastructure should be always kept in a presentable condition. Regulate the speed of vehicles on and off site. Use existing roads where possible. 	Significant / slightly harmful	Medium
Light pollution due to night lighting, security lighting and navigational lighting	Direct	Regional / neighbouring areas (5 km to 50 km) (WoM&WM)	Life of the activity (long term) (WoM&WM)	-	-	Great / harmful	Yes management measures can be implemented.	<ul style="list-style-type: none"> Ensure ongoing housekeeping. Choose lighting types that reduce spill light 	Significant / slightly harmful	Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Dust pollution from operation and maintenance vehicles.	Direct	Regional / neighbouring areas (5 km to 50 km) (WoM&WM)	Life of the activity (long term) (WoM&WM)	-	-	Great / harmful	Yes management measures can be implemented.	and glare. • - Only focus light where it is needed	Significant / slightly harmful	Medium
Light pollution due to night lighting, security lighting and navigational lighting	Direct	Regional / neighbouring areas (5 km to 50 km) (WoM&WM)	Life of the activity (long term) (WoM&WM)	-	-	Great / harmful	Yes management measures can be implemented.		Significant / slightly harmful	Medium
Visual impact on the identified	Direct	Regional / neighbouring areas (5	Life of the activity (long	-	-	Great / harmful	Yes management measures		Significant / slightly harmful	Medium

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
sensitive receptors		km to 50 km) (WoM&WM)	term) (WoM&WM)				can be implemented.			
Social										
Renewable energy infrastructure and clean renewable energy	Direct and Cumulative	Local, Regional and National (WoM&WM)	Long term (WoM&WM)	Yes	Reduced CO2 emissions and impact on climate change	Highly Probable	Yes	<ul style="list-style-type: none"> Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members. Maximise opportunities for local content, procurement, and community shareholding. 	Definite	High Positive

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> Maximise opportunities for local content and procurement. 		
Creation of employment and business opportunities	Direct and Cumulative	Local and Regional (WoM) (WM)	Long term (WoM) (WM)	-	No	Highly Probable	N/A	<ul style="list-style-type: none"> Local employment On the job training and development Local business development 	Highly Probable	Medium Positive
Generation of income for landowner	Direct	Local (WoM&WM)	Long Term (WoM&WM)	-	-	Probable	N/A	Agreements with affected landowners should be in place before SEF becomes operational	Probable	Medium Positive
Social Economic Development	Direct and Cumulative	Local and Regional (WoM&WM)	Long term (WoM&WM)	Yes	-	Probable	N/A	<ul style="list-style-type: none"> The proponents should liaise with the NKM to identify projects that can 	Definite	High Positive

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
and Enterprise Development								be supported by SED contributions. • Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community. • Strict financial management controls, including annual audits,		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								should be instituted to manage the SED contributions.		
Visual impacts and associated impact on sense of place	Direct	Local (WoM&WM)	Long term (WoM&WM)	-	-	Probable	Yes	The visual impact mitigation measures should be implemented	Probable	Low-Medium
Impact on property values	Indirect	Local (WoM&WM)	Long term (WoM&WM)	Yes	No	Probable	N/A	Due to the limited prospect of this occurring no mitigation measures are suggested	Probable	Low
Impact on tourism	Direct	Local (WoM) (WM)	Long term (WoM&WM)	Yes	No	Probable	Yes	<ul style="list-style-type: none"> The possible impact is low no mitigation is required Marketing area as a tourist attraction 	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Traffic										
Increase in traffic volumes on the surrounding road network during the operational phase.	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	• Routine road maintenance by the relevant Roads Authority.	Probable	Low
DECOMMISSIONING										
Terrestrial Biodiversity										
The ecological impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts.										
Agriculture										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Protection of soil resources	Direct	Local	Long Term (WoM) Short Term (WM)	-	-	Medium	Yes	<ul style="list-style-type: none"> Implement an effective system of storm water runoff control, where it is required that is at any points where run off water might accumulate. The system must effectively collect and safely disseminate any runoff water from all accumulation points and it must prevent any potential down slope erosion. 	Low	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> • Maintain where possible all vegetation cover and facilitate revegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. • If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								respreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.		
Visual										
Visual intrusion and dust creation from the movement of construction vehicles and heavy machinery	Direct	Local (within 5km) (WoM) Whole site (WM)	One year to 10 years (WoM&WM)	-	-	-	Significant / slightly harmful	<ul style="list-style-type: none"> Limit the decommissioning footprint to only the development area. Carefully plan to minimize the decommissioning duration. 	Small / potentially harmful	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Change in landscape character due to the removal of infrastructure	Direct	Local (within 5km) (WoM) Whole site (WM)	One year to 10 years (WoM&WM)	-	-	-	Significant / slightly harmful	<ul style="list-style-type: none"> Inform receptors of the decommissioning programme and schedule. Regulate the speed of vehicles on and off site. 	Small / potentially harmful	Low
Light pollution due to night lighting.	Direct	Local (within 5km) (WoM) Whole site (WM)	One year to 10 years (WoM&WM)	-	-	-	Significant / slightly harmful	<ul style="list-style-type: none"> Use existing roads where possible. Limit the number of vehicles travelling to and from site. 	Small / potentially harmful	Low
Dust pollution due to infrastructure removal and movement of construction	Direct	Direct	Local (within 5km) (WoM) Whole site (WM)	One year to 10 years (WoM&WM)	-	-	Significant / slightly harmful	<ul style="list-style-type: none"> Implement dust suppression activities. Ensure ongoing housekeeping. 	Small / potentially harmful	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
vehicles and heavy machinery.								<ul style="list-style-type: none"> Revegetate areas with suitable indigenous vegetation. Where possible, reshape the area so that it resembles the pre-construction landscape. Remove as much infrastructure as possible. Ensure that residual infrastructure remains in good condition. 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> Choose lighting types that reduce spill light and glare. Only focus light where it is needed. Ensure monitoring of rehabilitated areas for at least a year after decommissioning activities are completed. 		
Social										
Social impacts associated with	Direct	Local (WoM&WM)	Short term (WoM&WM)	-	-	Probable	Yes	<ul style="list-style-type: none"> The proponent should ensure that retrenchment packages 	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
decommissioning								are provided for all staff retrenched when the plant is decommissioned. <ul style="list-style-type: none"> All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning. 		
Traffic										
Gravel loss and possible damage to the	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	<ul style="list-style-type: none"> Resurfacing of sections along the R358, where required and regular 	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
road layer works as a result of additional truck traffic and heavy load truck traffic during the decommissioning phase.								road maintenance i.e. grading of the road once every two weeks during the decommissioning phase. <ul style="list-style-type: none"> The road can also be sprayed with water (grey water if available) once a day to limit dust pollution and gravel loss. 		

Table 3-5: Potential Cumulative Impacts

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
PLANNING AND CONSTRUCTION										
Terrestrial Biodiversity										
Vegetation and habitat loss	Cumulative	Regional/neighbouring areas (WoM)	Post closure (WoM)	With appropriate mitigation the impact can be ameliorated, but some residual impacts will remain (loss)	Possible	Often/regularly/likely/possible	To a degree	Implementation of all mitigation measures suggested within the Terrestrial Biodiversity Assessment Report	Infrequent/unlikely/seldom	Low-Medium
Increased habitat fragmentation		Whole site/plant/mine (WM)	Life of operation (WM)							
Loss of critical habitat for flora SCC as well as endemic species										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Loss of provincially protected species which require a permit				of vegetation) (WoM)						
Surface water impacts and associated ecological processes,				With appropriate mitigation the impact can be ameliorated (WM)						
Increased erosion due to flooding (not a yearly event but longer term),										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Increased alien flora and fauna species.										
Avifauna										
Habitat loss	Cumulative	Regional/neighbouring areas	Life of operation	Yes	No (WoM) Possibly (WM)	Daily/highly likely/definitely	Yes	Apply necessary buffers for roost and foraging sites and other sensitive bird habitat features, avoiding the construction of infrastructure and access roads in these areas. Roads must utilise	Daily/highly likely/definitely	High
Road Kills										
Powerlines										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Regional saturation of solar facilities								or upgrade existing farm roads as far as possible.		
Direct Mortality										
Aquatic										
Operation of equipment and machinery	Cumulative	Activity specific	One year to ten years	-	-	Often/regularly/likely/possible	Yes	<ul style="list-style-type: none"> The implementation of the buffer zone stipulated in this report; Clean and dirty surface water separation and a storm-water management plan must be put into 	Almost never/almost impossible	Low
Clearing vegetation	Cumulative	Activity specific	One year to ten years	-	-	Often/regularly/likely/possible	Yes		Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Stockpiling of and placement construction materials	Cumulative	Activity specific	One year to ten years	-	-	Often/regularly/likely/possible	Yes	place via standard best practice methods; • A clear storm-water management plan for hardened surfaces must	Almost never/almost impossible	Low
Excavating/shaping landscape	Cumulative	Activity specific	One year to ten years	-	-	Often/regularly/likely/possible	Yes	be implemented; Water Resource Study • The revegetation of	Almost never/almost impossible	Low
Final landscaping, backfilling and postconstruction rehabilitation	Cumulative	Activity specific	One year to ten years	-	-	Often/regularly/likely/possible	Yes	disturbed non-active cleared areas must take place within the first growing season between September and March following completion of the activity;	Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> The above must be audited within 3 months of completing the phase; No discharge of domestic water must occur if possible. Domestic water must be reused for dust suppression. All stockpiles and hazardous waste storage areas must be bunded by either a cut-off trench or berm directed to a Pollution Control Dam 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								inline with best practice surface water management guidelines. <ul style="list-style-type: none"> Any materials excavated must not be deposited in the river channel or valley slopes where it is prone to being washed downstream or impeding natural flow; The installation of sedimentation/erosion protection measures must be implemented before the start of construction, 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								e.g., several rows of silt traps and fences (this is particularly important in the access roads leading or adjacent to the watercourse); <ul style="list-style-type: none"> • Stockpiling or storage of materials and/or waste must be placed beyond the defined buffers in this report for each respective activity; 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> No vehicles shall enter watercourse buffer zones outside of construction footprints; No vehicles shall be serviced on site; a suitable workshop with appropriate pollution control facilities should be utilised offsite; Hydrocarbons for refuelling purposes must be stored in a suitable storage 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								device on an impermeable surface outside of the delineated wetland buffer zone; <ul style="list-style-type: none"> • Disturbed areas must be re-vegetated after completion of the phase; o A one-month timeframe for the initiation of this action; o Ripping of the soils should occur in two directions; and o Removed vegetation and topsoil can be 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								harvested and applied here. • Drainage channels constructed for the access roads must be constructed so as not to result in erosion; • An inspection of the drainage channels must be completed within 1 month following the end of activities and within a month after the first rainfall event which		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								exceeds 5mm. Should excessive sediment be transported down the channels it is recommended that sediment screens are implemented; <ul style="list-style-type: none"> • An alien vegetation removal and management plan must be implemented along the verges of the roads and crossing points; • General storm-water management practices should be included in the 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								design phase and implemented during the construction phase of this project; and • Following the completion of the phase, all construction materials and debris should be removed and disposed of in a suitable off-site area. An inspection should be completed within a week after the phase is completed.		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> • All contractors and staff are to be familiarised with the method statement and have undergone an induction / training on the location of sensitive No-Go areas and basic environmental awareness using the mitigation provided in this report. • Access routes into or adjacent to the washes must make use of existing 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								road ways and crossings where possible; <ul style="list-style-type: none"> • Areas where construction is to take place must be clearly demarcated. Any areas not demarcated must be avoided; • Storm-water generated from roadways must be captured and buffered, where flow velocities are to be significantly reduced before discharge into the environment. 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> Storm-water verges as well as other denuded areas must be grassed (revegetated) with local indigenous grasses to protect against erosion; 		
Agricultural										
Regional loss (including by degradation) of future agricultural production potential.	Cumulative	Local	Medium term (WoM) Short Term (WM)	-	-	Medium	Yes	Implement dust control measure A system of storm water management	Low	Low
Heritage										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Increasing as a result of the expansion of renewable energy facilities in the surrounding area	Cumulative	Local	Permanent (WoM and WM)	Not reversible (WoM and WM)	Yes (WoM and WM)	Improbable	-	<ul style="list-style-type: none"> Implementation of a Chance Find Procedure for the project; Sites of high significance will be preserved in no-go areas and have been recorded resulting in a low cumulative impact by the project. 	Improbable	Low
Visual										
Change in visual/landscape character and sense of place,	Cumulative	National	Life of the activity (long term) (WoM & WM)	-	-	Great / harmful	Yes	<ul style="list-style-type: none"> The recommended mitigation measures for the operational 	Significant / slightly harmful	Moderate

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
due to the presence of additional renewable energy facilities, from a largely undeveloped landscape to a more industrial type of landscape.								phase visual impacts, provided in Table 10-4, should be implemented. <ul style="list-style-type: none"> Where necessary, liaise with the neighbouring renewable energy facility's management to mutually decrease visual impacts on visually impacted sensitive receptors. 		
Additional levels of visual intrusion due to the presence of	Cumulative	National	Life of the activity (long term) (WoM & WM)	-	-	Great / harmful	Yes	visually impacted sensitive receptors.	Significant / slightly harmful	Moderate

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
additional renewable energy facilities and from the movement of additional maintenance vehicles and heavy machinery.										
Additional dust pollution due to increased traffic.	Cumulative	National	Life of the activity (long term) (WoM & WM)	-	-	Great / harmful	Yes			Moderate

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Additional light pollution due to additional night lighting, security lighting and navigational lighting.	Cumulative	National	Life of the activity (long term) (WoM & WM)	-	-	Great / harmful	Yes		Significant / slightly harmful	Moderate
Increased visual impact on the identified sensitive receptors.	Cumulative	National	Life of the activity (long term) (WoM & WM)	-	-	Great / harmful	Yes		Significant / slightly harmful	Moderate
Social										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Impact on Sense of Place	Cumulative	Regional/neighbouring areas	Long term (WoM & WM)	Yes. REF components and other infrastructure can be removed. (WoM & WM)	-	Probable	Yes	Recommendations of VIA should be implemented	Highly Probable	Moderate
Pressure on local services and accommodation	Cumulative	Local & Regional/neighbouring areas	Long term (WoM & WM)	Yes. REF components and other infrastructure can be removed.	No	Probable	Yes	The proponent should liaise with the KMM to address potential impacts on local services.	Highly Probable	Medium / Low negative

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Job Creation, Skills Development, training opportunities and creation of downstream business opportunities	Cumulative	Local	Long term (WoM & WM)	Yes. REF components and other infrastructure can be removed (WoM & WM)	No	Highly Probable	Yes	The proposed establishment of suitably sited renewable energy facilities and associated projects, such as the proposed SEF, within the KMM should be supported.	Highly Probable	High Positive
Traffic										
Increase in traffic volumes on the surrounding road network as	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	• Construction traffic should not be allowed on the public road network during the typical weekday a.m.	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
a result of construction traffic								and p.m. peak hours in built up areas. These measures will be included in the Transport Management Plan		
Gravel loss and possible damage to the road layer works. as a result of additional truck traffic and heavy load truck traffic	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	<ul style="list-style-type: none"> Resurfacing of sections along the R358, where required and regular road maintenance i.e. grading of the road once every two weeks during the construction phase. 	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								The road can also be sprayed with water (grey water if available) once a day to limit dust pollution and gravel loss.		
OPERATION										
Avifauna										
Road-kills	Cumulative	Regional/neighbouring areas	Life of operation	No	Yes	Daily/highly likely/definitely	Yes	Avoid placement of infrastructure near sensitive bird breeding and roosting habitats. Where service road intersect with semi natural or natural habitat, all fences must be set back	Daily/highly likely/definitely	High

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								at least (strictly) 75 metres from the edge of every service road in order to allow for vulnerable species such as cranes and korhaans to obtain adequate height after being flushed by vehicle traffic. Alternatively, the fences must be placed completely adjacent to the roads with a maximum of 3 metres buffer and marked with fence		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								flappers in order to reduce flush related collisions.		
Powerlines	Cumulative	Regional/neighbouring areas	Life of operation	No	Yes	Daily/highly likely/definitely	Yes	Apply necessary buffers for roost and foraging sites and other sensitive bird habitat features, avoiding the construction of infrastructure and access roads in these areas. Roads must utilise or upgrade existing farm roads as far as possible. Formal post construction monitoring	Daily/highly likely/definitely	High
Aquatic										

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Alteration of drainage	Cumulative	Activity specific	Life of operation			Often/regularly/likely/possible		<ul style="list-style-type: none"> The implementation of the buffer zones provided in this report; 	Almost never/almost impossible	Low
Alteration of surface water flow dynamics	Cumulative	Activity specific	Life of operation			Often/regularly/likely/possible		<ul style="list-style-type: none"> Clean and dirty surface water separation and storm-water management 	Almost never/almost impossible	Low
Establishment of alien plants on disturbed areas	Cumulative	Activity specific	Life of operation			Often/regularly/likely/possible		<ul style="list-style-type: none"> plan must be put into place via standard best practice methods; An effective storm-water management plan for all infrastructure must be implemented; The revegetation of disturbed non active 	Almost never/almost impossible	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								cleared areas must take place within 1 month of completing the construction phase; <ul style="list-style-type: none"> • The above must be audited within 3 months of completing the phase; • No discharge of domestic water must occur if possible. Domestic water must be reused for dust suppression. Should domestic water be required to be discharge, 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								the management of nitrogen concentrations is imperative. <ul style="list-style-type: none"> • All stockpiles and hazardous waste storage areas must be bunded by either a cut-off trench directed to a Pollution Control Dam or via a berm. • The implementation of the buffer zones provided in this report; • Clean and dirty surface water separation and 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								storm-water management plan must be put into place via standard best practice methods; <ul style="list-style-type: none"> An effective storm-water management plan for all infrastructure must be implemented; The revegetation of disturbed non active cleared areas must take place within 1 month of completing the construction phase; 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
				WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								<ul style="list-style-type: none"> • The above must be audited within 3 months of completing the phase; • No discharge of domestic water must occur if possible. Domestic water must be reused for dust suppression. Should domestic water be required to be discharge, the management of nitrogen concentrations is imperative. • All stockpiles and 		

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								hazardous waste storage areas must be bunded by either a cut-off trench directed to a Pollution Control Dam or via a berm.		
Traffic										
Increase in traffic volumes on the surrounding road network during the operational phase.	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	Routine road maintenance by the relevant Roads Authority.	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
Decommissioning										
Gravel loss and possible damage to the road layer works as a result of additional truck traffic and heavy load truck traffic during the decommissioning phase.	Direct	Local	Short Term (WoM&WM)	-	-	Highly Probable	Yes	<ul style="list-style-type: none"> Resurfacing of sections along the R358, where required and regular road maintenance i.e. grading of the road once every two weeks during the decommissioning phase. The road can also be sprayed with water (grey water if available) once a day to limit dust pollution	Probable	Low

Nature of impact (potential)	Direct or indirect or cumulative	Extent of impact	Duration of impact	Can impact be prevented/reversed or managed?	Will irreplaceable resources be lost?	Probability before mitigation	Mitigatory potential	Mitigation measure	Probability after mitigation	Significance after mitigation
			WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation	WoM- Without Mitigation WM- With Mitigation					
								and gravel loss.		

4 Recommended Monitoring Requirements

- The applicant must ensure that the construction and post-construction mitigation measures and controls specified in the EMPr are adhered to. An independent ECO must be appointed to assess compliance with these measures and to enforce the EMPr.
- Environmental audits during the construction phase should be conducted on a monthly basis by an independent ECO in addition to a post-construction audit (PCA), Avifauna as per Birdlife guidelines.
- The post-construction avifauna monitoring reports must be submitted to BirdLife South Africa as per the guidelines and as per recommendations by the Avifauna Specialists.
- Mitigation measures provided by all specialists are to be adhered to.
- Inclusions, additions and adaptations of the EMPr, as well as all final plan drawings and maps must be submitted to DFFE for final approval.
- The high cumulative risk on regional bird fatalities, it is recommended that if the post-construction bird monitoring programmes determine that allowable fatality thresholds are exceeded, then De Rust PV1 SEF should be required to engage with DFFE, BirdLife South Africa and a curtailment plan developed and implemented if deemed the appropriate response.
- Post construction bird monitoring to be undertaken by a qualified individual, approved by a specialist.
- Bi-annual reporting of avifaunal mortalities associated with collision data highlighting locations where corrective measures are to be taken (if necessary) and submitted to BirdLife South Africa
- Annual reporting presenting data analysis results and mapping indicating locations of change. Specific reporting on negative change detection not directly attributable to Project activities and their cause. All reporting to be accompanied by GIS shapefiles and any original photographs
- Water Crossing points associated with linear infrastructure to determine if erosion is occurring should occur once every 2 years
- Depression systems to monitor avoidance should occur once every 2 years
- Areas of Heritage and Palenthnology importance should implement a Chance Find Procedure for the project;
- All Audits should be present onsite and available if requested by relevant government officials.

Avifauna Monitoring Requirements:

SCC community monitoring:

Sampling Method

- Vantage Point counts – 3 x Three-hour counts (morning, midday and evening) to be conducted at each monitoring plot
- Drive Transects (species lists) – all species seen to be recorded along set transects to be driven during dawn till pre 10 am; and
- Walked Transects (species lists) – all species heard and seen to be recorded along set transects to be walked at dawn chorus
- Red Lark specific monitoring to be commissioned for documenting behavioural and ecological responses of the species in relation to turbine establishment adjacent to optimal habitat (periodicity yet to be determined)

Frequency

- Annual wet and dry season surveys; and
- Continuous observations by ECO

Reporting

- Annual reporting presenting data analysis results and mapping indicating locations of change.

Collision and mortality monitoring:

Sampling Method:

- For powerlines: Weekly surveys (collision and ground/ sky scans for susceptible species) before dawn (prior to scavenger activity) by driving slowly along the servitudes and documenting each collision kill location and species (a georeferenced photograph as evidence is required).
- For turbine and solar panel location sites: daily inspection on foot of cleared areas for birds killed during the operation process. Location and species must be recorded (a georeferenced photograph as evidence is also required).
- From the collision detection monitoring team, the north-west quadrant (as well as the three large water points within the delineated area) must be subjected to daily sky/ ground scans over the wet-season (or during periods causing localised inundation) in order to assess collision presence/ absence of target species, reassess collision mortality risk and establish some foundational behavioural analysis over the long-term.

Frequency:

- Weekly for powerlines, daily for turbines
- Separate daily sky scans during the wet season and immediately post rainfall events

Reporting

- Bi-annual reporting of faunal avifaunal mortalities associated with collision data highlighting locations where corrective measures are to be taken (if necessary).

Carcass monitoring

Sampling Method:

- Monitoring of livestock herds, especially during lambing/ birthing season
- A thermal drone with a large radius must patrol target areas during the night in order to pick up the heat signature of large-bodied animals in a state of decomposition.

Frequency:

- Three-times weekly for herds, daily during birthing season

Reporting

- Annual reporting of faunal livestock mortalities and numbers of carcasses located (including locations) associated with presence of vultures and large raptors.

Heritage Chance Find Procedures

Heritage Resources

The possibility of the occurrence of subsurface finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMP.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

Monitoring Program for Paleontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (trace fossils, fossils of plants, insects, bone or coalified material) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
3. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished then no further monitoring is required.

5 Procedures for environmental related emergencies and remediation

The purpose of this section is to anticipate a potential impact resulting in an environmental crisis which may occur due to unforeseen circumstances. Such events cannot be predicted and as such a procedure has been prepared. This procedure must be followed in the event of such an incident to prevent degradation to the surrounding environment and to contribute to the safety of the workers and I & APs.

5.1 POTENTIAL ENVIRONMENTAL INCIDENCES / EMERGENCIES

The National Environmental Management Act (NEMA) defines an ‘incident’ as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed. The following hazards have the potential to occur within the proposed site:

- Hazardous chemical spillage
- Leakage of fuel or oil from equipment
- Potential contamination of water resources (ground and surface).
- Damage to surrounding infrastructure
- Erosion of areas stripped of groundcover

5.2 RESPONSE TO ENVIRONMENTAL EMERGENCIES

The emergency response plan (Appendix 4) must be used to update the onsite emergency response plans. A record of all incidents must be recorded as defined in NEMA and NWA (Appendix 5). Incidents should be reported and recorded the relevant authority as soon as reasonably practicable after knowledge of the incident.

An emergency incident report (Appendix 6) must be completed in terms of section 30(5) of the National Environmental Management Act (Act No. 107 of 1998).

“The responsible person or, where the incident occurred in the course of that person’s employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

- (a) the nature of the incident;*
- (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;*
- (c) initial measures taken to minimise impacts;*
- (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and*
- (e) measures taken and to be taken to avoid a recurrence of such incident.”*

5.3 ENVIRONMENTAL AWARENESS PLAN

In accordance with NEMA EIA, 2017 regulations, an environmental awareness plan is required. As part of the environmental awareness plan 'Toolbox Talks' posters have been developed and can be used for training purposes.

- **Objectives of the plan**

The objective of the environmental awareness plan is to inform employees and contractors of any environmental risks which may result from their work and the manner in which the identified possible risks must be dealt with in order to prevent degradation of the environment.

- **Content of the plan**

The environmental awareness plan should include:

- The definition of environment (people + air + soil + water +business);
- Reasons for conserving and protecting the environment;
- How the following activities can impact the environment: - Not using assigned ablutions, hazardous materials, uncleaned spills, mixing of cement or paint on soil or grass surfaces, waste management i.e. use of waste receptacles and waste separation for recycling, vehicle washing polluting soil & ground water; litter;
- What to do to prevent the above impacting the environment i.e. assign impermeable mixing areas, no vehicle washing on site, use of waste receptacles and separation of waste to allow for recycling, how to respond in an emergency and deal with a spill; and
- Consideration of neighbours.

The environmental awareness plan that should be presented to employees is attached in Appendix 7. A training record of all staff that has undergone environmental training must be kept on record (Appendix 8).

6 CONCLUSION

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) everyone is required to take reasonable measures to ensure that they do not pollute the environment. Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally acceptable manner.

Furthermore, in terms of the Act, the cost to repair any environmental damage shall be borne by the person responsible for the damage. It is therefore imperative that the management plan is successfully implemented, as a failure to comply could have legal implications.

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr must be seen as a day-to-day risk management tool. The EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the De Rust PV1 SEF as detailed in the EIR and associated specialist reports (Appendices D). The EMPr could thus change on a regular basis subject to changes in the scale and scope of the SEF, and if implemented effectively, will reduce the environmental and social risks associated with the planning & design, construction, operational and decommissioning phases of the project.

Further guidance should also be taken from any conditions contained in the EA, and that these DFFE conditions must be incorporated into the final EMPr.

APPENDICES

APPENDIX 1: LETTER OF ACCEPTANCE OF EMPR

RE: FE De Rust Pty Ltd

To whom it may concern

This is to state that the undersigned have received a copy of the Environmental Management Programme (EMPr) developed for this site dated May 2023. The undersigned do hereby agree to abide by the strictures of the Environmental Management Programme (EMPr). Any contravention of the EMPr will be recorded and corrective action will be carried out.

Any changes to the EMPr must be approved by the *Environmental Control Officer (ECO)*, the relevant Environmental Assessment Practitioner (EAP) and the relevant authority. Such changes are to be made in writing and a record must be maintained.

As Agreed on this day _____ of _____ (Month) _____ (Year)

Environmental Control Officer (ECO)

Name _____

Signed _____

Contractor

Name _____

Company _____

Signed _____

Engineer

Name _____

Company _____

Signed _____

APPENDIX 2: COMPLAINTS REGISTER

This a register for recording all complaints received from neighbours i.e. Complaints about noise, odours, dust etc.

Date of complaint	Complainant's name	Contact Details (phone)	Nature of complaint	Corrective action taken	Date action completed

APPENDIX 3: NON-CONFORMANCE RECORD AND AUDIT TEMPLATE

This is record of non-compliances with the EMPr i.e., any action taken that is in violation of the EMPr must be recorded e.g. mixing concrete directly on soil, site staff using neighbouring properties as toilet facilities, dumping of material over fence etc.

Date of Non-conformance	Details of non-conformance	Party/ies responsible	Corrective action taken	Date action completed

APPENDIX 4: BASIC EMERGENCY RESPONSE PLAN

AIM

- 1) The effective response to emergency incidents.
- 2) The control of emergency incidents.
- 3) Recording incidents and ensuring that where possible, all measures are taken to prevent them from re-occurring

DEFINITION OF AN “INCIDENT”

As defined by NEMA, section 30 “Control of emergency incidents”

(1) In this section—

- (a) “incident” means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed;
- (b) “responsible person” includes any person who—
 - (i) is responsible for the incident;
 - (ii) owns any hazardous substance involved in the incident; or
 - (iii) was in control of any hazardous substance involved in the incident at the time of the incident;
- (c) “relevant authority” means—
 - (i) a municipality with jurisdiction over the area in which an incident occurs;
 - (ii) a provincial head of department or any other provincial official designated for that purpose by the MEC in a province in which an incident occurs;
 - (iii) the Director General;
 - (iv) any other Director General of a national department.

As defined by the National Water Act section 20 “Control of emergency incidents”

(1) In this section “incident” includes any incident or accident in which a substance -

- (a) pollutes or has the potential to pollute a water resource; or
- (b) has, or is likely to have, a detrimental effect on a water resource.

Definition of an Incident on Site

Spills, contamination of soil and or stormwater, fires, explosions.

CONTENTS OF REPORT TO AUTHORITIES

As taken from NEMA, Section 30: Control of Emergency Incidents”

(3) The responsible person or, where the incident occurred in the course of that person’s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available—

- (a) the nature of the incident;
- (b) any risks posed by the incident to public health, safety and property;
- (c) the toxicity of substances or by products released by the incident; and
- (d) any steps that should be taken in order to avoid or minimise the effects of the incident on public health and the environment to—
 - (i) the Director General;
 - (ii) the South African Police Services and the relevant fire prevention service;

- (iii) the relevant provincial head of department or municipality; and
 (iv) all persons whose health may be affected by the incident.
- (4) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, as soon as reasonably practicable after knowledge of the incident—
- take all reasonable measures to contain and minimise the effects of the incident, including its effects on the environment and any risks posed by the incident to the health, safety and property of persons;
 - undertake clean-up procedures;
 - remedy the effects of the incident;
 - assess the immediate and long term effects of the incident on the environment and public health.
- (5) The responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including—
- the nature of the incident;
 - the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
 - initial measures taken to minimise impacts;
 - causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
 - measures taken and to be taken to avoid a recurrence of such incident.
- (6) A relevant authority may direct the responsible person to undertake specific measures within a specific time to fulfil his or her obligations under subsections (4) and (5): Provided that the relevant authority must, when considering any such measure or time period, have regard to the following:
- the principles set out in section 2;
 - the severity of any impact on the environment as a result of the incident and the costs of the measures being considered;
 - any measures already taken or proposed by the person on whom measures are to be imposed, if applicable;
 - the desirability of the State fulfilling its role as custodian holding the environment in public trust for the people;
 - any other relevant factors.
- (7) A verbal directive must be confirmed in writing at the earliest opportunity, which must be within seven days.
- (8) Should—
- the responsible person fail to comply, or inadequately comply with a directive under subsection (6);
 - there be uncertainty as to who the responsible person is; or
 - there be an immediate risk of serious danger to the public or potentially serious detriment to the environment, a relevant authority may take the measures it considers necessary to—
- contain and minimise the effects of the incident;
 - undertake clean-up procedures; and
 - remedy the effects of the incident.

As taken from the National Water Act section 20 "Control of emergency incidents"

- (2) In this section, "responsible person" includes any person who -
- is responsible for the incident;
 - owns the substance involved in the incident; or
 - was in control of the substance involved in the incident at the time of the incident.
- (3) The responsible person, any other person involved in the incident or any other person with knowledge of the incident must,

as soon as reasonably practicable after obtaining knowledge of the incident, report to -

- (a) the Department;
- (b) the South African Police Service or the relevant fire department; or
- (c) the relevant catchment management agency.

(4) A responsible person must -

- (a) take all reasonable measures to contain and minimise the effects of the incident;
- (b) undertake clean-up procedures;
- (c) remedy the effects of the incident; and
- (d) take such measures as the catchment management agency may either verbally or in writing direct within the time specified by such institution.

The following emergency procedures are guidelines only and should be used in conjunction with the emergency response plan provide by the contractor.

ON SITE EMERGENCY PROCEDURES

SPILL RESPONSE

RESPONSIBLE PERSON/S

- The spill is reported to the Foreman who must report to his superior who must report to the ECO.
- All employees should be made aware of the procedure in case of a spill.
- The ECO must report to relevant authorities if contamination occurs and if spill falls within the definition of a spill

PROCEDURE

- Identify nature and size of spill e.g. oil 20L. Consult MSDS for safety precautions
- Protect exposed stormwater drains, prevent entry of substance to stormwater drains and drainage line.
- For a small spill (less than a litre, locate spill kit, contain spill according to the training from the spill kit suppliers
- For large spill (unable to deal with on-site), contact external spill control contractors
- Determine appropriate method for disposal of material based on information provided in MSDS
- Determine if any contamination has occurred i.e. entry to stormwater, soil contamination
- If contamination has occurred, consult with authorities on need for on-going monitoring and or rehabilitation requirements. Determine medium and long term effects. Stormwater incidents should be reported to Waste water
- If no contamination has occurred, determine if spill falls under definition of an "incident" and if so, report to relevant authorities.
- Record in Incidents register
 - o Nature of incident
 - o Cause of incident
 - o Contamination if any
 - o Measures taken to control spill and handle contamination
 - o If spill falls under definition of an incident
 - o Mitigation measures taken to prevent re-occurrence
- Record in non-compliance register and incident (if defined as incident)
- The ECO must review all spill reports
- Adjustments will be made, if necessary, to the operational and emergency procedures to prevent future occurrences

FIRE

RESPONSIBLE PERSON/S

- The spill is reported to the Foreman who must report to his superior who must report to the ECO.

- All employees should be made aware of the procedure in case of a spill.
- The ECO must report to relevant authorities if contamination occurs and if spill falls within the definition of a spill

PROCEDURE

- Identify source and nature of fire
- In case of small fire extinguish with material appropriate to the nature of the fire. Consult MSDS.
- Immediately contact the ECO. In case of a large fire contact Fire Department
- Seal off exposed stormwater drains to ensure spill does not cause any external contamination
- Determine whether any contamination has occurred
- If contamination has occurred, consult with authorities to determine appropriate rehabilitation and monitoring
- Record in incident register:
 - o Nature of incident
 - o Cause of incident
 - o Clean up measures
 - o Mitigation measures taken
- Record in non-compliance register and record as incident if applicable.
- The ECO must review all fire reports
- Adjustments will be made, if necessary, to the operational and emergency procedures.


APPENDIX 5: INCIDENT RECORD

This is record of incidents as defined in NEMA and the NWA. Incidents should be recorded and reported to the applicable authorities.

Date of incident	Details of incident	Party / ies responsible	Corrective action taken	Date action completed

APPENDIX 6: EXAMPLE OF AN EMERGENCY INCIDENT REPORT

EXAMPLE OF AN EMERGENCY INCIDENT REPORT FORM (SOURCE: WWW.DFFE.GOV.ZA/DOCUMENTS/FORMS)

 <p>environmental affairs Department: Environmental Affairs REPUBLIC OF SOUTH AFRICA</p>	Document Type:	Emergency Incident Report	
	Title for the Incident:		
	Date of the incident:		
Reference:	[A reference that may be used in future correspondence]	Initial Submission Date:	[Date of initial submission of the report to the Department: Environmental Affairs, Tourism]
Revision No.:	example	Compiled by:	[Full name and contact details of the person submitting the report]

This form provides a template for the emergency incident report required in terms of section 30(5) of the National Environmental Management Act (Act No. 107 of 1998) (hereinafter "NEMA") in which the responsible person or, where the incident occurred in the course of that person's employment, his or her employer, must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including: (a) the nature of the incident; (b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects; (c) initial measures taken to minimise impacts; (d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and (e) measures taken and to be taken to avoid a recurrence of such incident.

In terms of section 30(1)(a) of NEMA, an "incident" means an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In line with section 24 of the Constitution of the Republic of South Africa (Act No. 108 of 1996), "serious" is taken to be a measure of the impact of an incident where such an incident has had, could have had, is having, or will have a negative impact on human health or well-being.

1. RESPONSIBLE PERSON			
In terms of section 30(1)(b) of NEMA, the "responsible person" includes any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident			
Name:	[Full name of person, company, etc.]	Designation:	[designation of responsible person (n/a for companies, etc.)]
Postal Address:	[Full postal address including postal code]	Physical Address:	[Full physical address]

1. RESPONSIBLE PERSON			
In terms of section 30(1)(b) of NEMA, the “responsible person” includes any person who: (i) is responsible for the incident; (ii) owns any hazardous substance involved in the incident; or (iii) was in control of any hazardous substance involved in the incident at the time of the incident			
Telephone (B/H)	[Business hours contact telephone number and area code]	Telephone (A/H)	[After hours contact telephone number and area code]
Fax:		Email:	
Nature of Business:	[Brief summary of the nature of the business]		

2. EMERGENCY INCIDENT SUMMARY INFORMATION							
Mark the appropriate boxes							
2.1 Fire		2.2 Spill		2.3 Explosion		2.4 Gaseous Emission	
2.5 Injuries		2.6 Reportable injuries:		2.7 Hospitalisation		2.8 Fatalities	
2.9 Open water impacts		2.10 Ground water impacts		2.11 Atmospheric impacts		2.12 Soil impacts	
2.13 Own emergency response involved		2.14 Fire prevention services involved		2.15 Government hazardous materials emergency response involved		2.16 More than 1 governmental emergency response service involved	
2.17 Emission of non-toxic substances at low concentrations		2.18 Emission of non-toxic substances at high concentrations		2.19 Emission of toxic substances at low concentrations		2.20 Emission of toxic substances at high concentrations	
2.21 No evacuation required		2.22 Immediate area evacuated		2.23 Immediate surrounds evacuated		2.24 Evacuation of the general public	
2.25 Others							

3. INITIAL EMERGENCY INCIDENT REPORT

In terms of section 30(3) of NEMA, the responsible person or, where the incident occurred in the course of that person’s employment, his or her employer must forthwith after knowledge of the incident, report through the most effective means reasonably available: (a) the nature of the incident; (b) any risks posed by the incident to public health, safety and property; (c) the toxicity of substances or by products released by the incident; and (d) any steps that must be taken in order to avoid or minimise the effects of the incident on public health and the environment to: (i) the Director General; (ii) the South African Police Services and the relevant fire prevention service; (iii) the relevant provincial head of department or municipality; and (iv) all persons whose health may be affected by the incident.

Description	Date:	Time:	Medium:	Name and Contact Details:
Relevant fire prevention services: (in case of fire)	[submission date]	[submission time]	[Fax, phone, SMS, letter, etc.)	[who was the report made to?]
Local:				
Provincial: (Those deal with Environmental issues)				
DIRECTOR GENERAL: (Department of Environmental Affairs)				
Any other Director General of National Department eg DWA				

4. INCIDENT DETAILS

In terms of NEMA section 30(5)(a) and (d), the responsible person must report on the nature of the incident as well as the causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure

4.1 Location of the incident	[Provide physical address of the location where the incident happened including the GPS co-ordinates]		
Incident start date and time:	[The exact time that the unexpected event started]	Incident duration:	[the duration of the unexpected event]
Duration of exposure:	[The duration of conditions that had a direct impact anyone’s health or well-being]		

4. INCIDENT DETAILS

In terms of NEMA section 30(5)(a) and (d), the responsible person must report on the nature of the incident as well as the causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure

Incident description

Background of the incident:

Operation:

Incident type:

Root Cause of the incident:

Contributing factors to the incident:

Conclusion:

Wind speed and direction	[The wind speed and direction at the point of the incident at the time of the incident]	Ambient air temperature	[ambient air temperature at the time of the incident]
Weather conditions	[Sunny, light rain, mist, heavy rain, etc.]	Other relevant meteorological conditions	[Temperature inversion, floods, etc]

5. POLLUTANTS RELEASED DURING INCIDENT

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity.

List all the pollutants directly released during the incident (i.e. exclude those pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.)

5.1 Substance or mixture of substances	5.2 Reference Number	5.3 Phase	5.4 Total Quantity emitted	5.5 Unit	5.6 Nature of emission
[The name recognised by any national or internationally	[Reference to any national or internationally	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released	[the unit of measure in	[emitted from truck,

5. POLLUTANTS RELEASED DURING INCIDENT

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity.

List all the pollutants directly released during the incident (i.e. exclude those pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.)

5.1 Substance or mixture of substances	5.2 Reference Number	5.3 Phase	5.4 Total Quantity emitted	5.5 Unit	5.6 Nature of emission
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[emitted from truck, underground pipe, stack, etc.]

6. SECONDARY POLLUTANTS RESULTING FROM INCIDENT

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.

List all the pollutants that resulted from mitigation measures, e.g. flaring, treatment, dilution etc.

6.1 Substance or mixture of substances	6.2 Reference Number	5.3 Phase	5.4 Total Quantity emitted	5.5 Unit	5.6 Nature of emission
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[solid, semi-solid, liquid or gas]	[the total measured or estimated quantity released into the environment]	[the unit of measure in respect to the quantity]	[emitted from truck, underground pipe, stack, etc.]

7. POLLUTANT CONCENTRATIONS

In terms of NEMA section 30(5)(b), the responsible person must report on the substances involved and an estimation of the quantity released.

List all the pollutants detailed above.

7.1. Substance or mixture of substances	7.2. Reference Number	7.3. Estimated pollutant concentration			
		7.3.1. 10m	7.3.2. 100m	7.3.3. 500m	7.3.4. >2000m
[The name recognised by any national or internationally recognised chemical referencing system]	[Reference to any national or internationally recognised chemical referencing system]	[estimate the concentration of the pollutant in water, soil and/or air within a 10m radius of the epicentre of the incident] [provide the units used in a case of estimating concentrations eg ppm]	[estimate the concentration of the pollutant in water, soil and/or air within a 100m radius of the epicentre of the incident] [provide the units used in a case of estimating concentrations eg ppm]	[estimate the concentration of the pollutant in water, soil and/or air within a 500m radius of the epicentre of the incident] [provide the units used in a case of estimating concentrations eg ppm]	[estimate the concentration of the pollutant in water, soil and/or air within a >2000m radius of the epicentre of the incident] [provide the units used in a case of estimating concentrations eg ppm]

8. INCIDENT IMPACT

In terms of NEMA section 30(5)(b), the responsible person must report on possible acute effect on persons and the environment and data needed to assess these effects;

8.1 Minor injuries	[Describe the number and types of any minor injuries that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.2 Reportable injuries	[Describe the number and types of any injuries requiring statutory reporting that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.3 Hospitalisation	[Describe the number and types of any injuries that required professional medical care that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.4 Fatalities	[Describe the number and cause of any fatalities that resulted from the incident or efforts to manage the incident or the impacts thereof]
8.5 Biological impacts	[Describe any impacts on biological life, other than human life, e.g. fish kills, plant mortality, etc.]

8.6 Impact area	[Describe the area possibly affected by the incident or the impacts thereof including: (i) size of the area; (ii) socio-economic context; (iii) population density; (iv) sensitive environments (if any), etc.]
8.7 Data	Attach relevant impact reports, medical reports, death certificates, post mortem reports, environmental monitoring data, etc. as Annexes C1, C2,... to this report

9. EXISTING PREVENTION PROCEDURES AND/OR SYSTEMS

9.1 Foresight	[Briefly describe whether the incident could have, or had, been foreseen, e.g. was it included in any environmental impact assessment, risk assessment, health and safety plan, etc.]
9.2 Procedures and/or systems	Attach any relevant safety, health and environmental plans (including any statutory planning requirements) that detail what actions must be taken in the event of the incident that is the subject of this report
9.3 Procedure and/or systems failures	[Describe any failures or shortfalls in procedures and/or systems that may have contributed to the incident]
9.4 Technical measures	[Describe any technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurrence of the incident]
9.5 Technical failure	[Describe any failures of technical measures, equipment, 'fail-safe' devices, etc. that are in place to prevent the occurrence of the incident]

10. INITIAL INCIDENT MANAGEMENT

In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.

10.1 Evacuation	[Describe any evacuation activities including information on the number of people evacuated and whether these people were staff or otherwise]
10.2 Technical measures	[Describe all technical measures taken to address the incident]
10.3 Mitigation measures	[Describe all measures taken to minimise the impact]
10.4 Emergency Services	[Describe any governmental emergency services involvement]

11. CLEANUP AND/OR DECONTAMINATION

In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.

11.1 Cleanup and/or decontamination	[Provide a detailed description of all cleanup and/or decontamination activities and the environmental quality and impacts resulting from these activities as well as contact details for any contracted service providers in an annex.]
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11. CLEANUP AND/OR DECONTAMINATION			
In terms of NEMA section 30(5)(c), the responsible person must report on initial measures taken to minimise impacts.			
11.2 Permissions and Instructions			
Provide details of any permissions and/or instructions received from any organ of state during initial incident management, cleanup and/or decontamination			
11.3 Type	11.4 Statute	11.5 Issued By	11.6 Name and contact details
[Describe the nature or type of permission or instruction]	[Provide a reference to the legal mandate for the permission or instruction]	[Provide contact details for the permitting or instructing authority]	[provide a summary of the activities carried out in terms of the permission or instruction]

12. MITIGATION MEASURES			
In terms of NEMA section 30(5)(e), the responsible person must report on measures taken and to be taken to avoid a recurrence of such incident.			
12.1 Measure	12.2 Objective	12.3 Cost	12.4 Timing
[Briefly describe each of the measures taken, and to be taken, to avoid a recurrence of such incident]	[Briefly describe the objective of the measure, i.e. the desired outcome of the measure]	[Estimate the cost of the measure in terms of capital costs and/or recurrent costs]	[Provide information on the timing for the full implementation of the measure]

13. AUTHORISATIONS			
Provide detail on all authorisations (including permits, licenses, certificates, etc.) in respect of the activity to which the incident relates.			
13.1 Type	13.2 Statute	13.3 Issued By	13.4 Issue & Expiry Date
[Describe the nature or type of authorisation, e.g. Registration Certificate]	[Provide the reference for the authorisation, e.g. section X of the National Environmental Management Act (Act No. 107 of 1989)]	[Provide contact details for the issuing authority]	[provide the date of issue and expiry]

14. HISTORY

Provide details on any and every similar incident involving the responsible person in the last 24 months. Similar incidents include those that: (i) involved similar circumstances; (ii) involved similar emissions; (iii) involved similar personal; and/or (iv) involved similar impacts.

14.1 Incident title	14.2 Report reference	14.3 Date of incident	14.4 Summary of event
[Provide the title used in the relevant emergency incident report]	[Provide the reference in respect of the relevant emergency incident report]	[Date of incident]	[Provide a summary of the event]

Signed by, or as a mandated signatory for, the responsible person:		Date:	
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APPENDIX 1

List of affected people as results of the incident

NAME	ADDRESS	PHONE	FAULT	REMARKS

APPENDIX 2

Disclaimer: Any other information not covered in the reporting template must be included.

CAUTION: In terms of section 30 (11) of NEMA as amended, it is an offence not to report an incident and liable on conviction to a fine not exceeding R 1 million or imprisonment for a period not exceeding 1 year, or to both such a fine and such imprisonment.

APPENDIX 7: ENVIRONMENTAL AWARENESS PLAN

SITE ENVIRONMENTAL RULES

TOOLBOX TALK 1:

Definitions, EMPr, and Site Environmental Rules.

ISSUE:

Do's and Don'ts of the Construction Site.

PRESENTER:

What is the Environment?

Environment (NEMA, 1998) - means the surroundings within which humans exist and that are made up of:

- the land, water and atmosphere of the earth;
- microorganisms, plant and animal life;
- any part or combination of (i) and (ii) and the interrelationships among and between them; and
- the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing;

What is the Pollution?

Pollution (NEMA, 1998) - means any change in the environment caused by -

- substances;
- radioactive or other waves; or
- noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or wellbeing or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future;

What is an EMPr?

Environmental Management Programme – refers to a document that is used to investigate, assess and evaluate the impacts that a development is likely to have on the environment during the construction, operation and decommission phases.

Why should we protect the Environment?

- It is our right to live in a clean and healthy environment.
- To ensure that future generations live in a clean environment.
- To prevent the loss of species diversity.
- To prevent loss of ecological goods and services

Environmental Site Rules:

- *No urinating or defecating on site. Toilet facilities provided at the construction site must be used at all times*
- *Do not waste water*
- *No littering*
- *No washing of cars or other vehicles on site*
- *Do not use spill kits for disposal of waste*
- *Do not dispose of any waste / wastewater in watercourses.*

DISPENSING, STORAGE AND DISPOSAL OF HYDROCARBONS/MINERAL

TOOLBOX TALK 2:

Definitions, EMPr, and Site Environmental Rules.

ISSUE:

Do's and Don'ts of the Construction Site.

What is a Hydrocarbon (mineral oil)?

Diesel/hydraulic oil etc. are hydrocarbons and therefore classified as hazardous substances. A hazardous substance is any material that poses an unreasonable risk to people, property and the environment. The environment is our surroundings, soil, air and water.

What is the risk?

- Regular dispensing and offloading of diesel increases the risk of a spillage occurring.
- Changing hydraulic lines/ greasing parts / basic maintenance of vehicles
- Leaks from vehicles and equipment

Hydrocarbons are toxic if swallowed by humans or animals. The presence of hydrocarbons in water can also prevent aquatic organisms from breathing and may result in aquatic kills depending on the extent of the spill. Hydrocarbons should therefore be prevented from contaminating ground or surface water.

Note:

Only 1 litre of oil can contaminate a soccer field size of water. It is therefore essential to prevent spillages as far as possible and to ensure that if they do occur that they are properly cleaned up and that the resulting material is disposed of correctly.

What is a spillage?

All situations involving the spilling of a hydrocarbon on to the floor or ground or water.

How do we manage this?

- 1 Correct Storage:**
 - a. Refer to issues around the bunded area.
 - b. Should be contained in waterproof and leak proof containers. Any containers or points that are leaking to be addressed immediately.
 - c. Should be stored in a dedicated area on site.
- 2 Correct Dispensing:**
 - a. Should check lines for leaks before starting with dispensing.
 - b. Place drip tray so as to catch any drips. How would you and into what would you empty the drip tray?
 - c. Ensure all residual diesel/oil is drained from pipe before disconnecting.
- 3 Maintenance of vehicles and equipment**
 - a. Check equipment and vehicles for leaks daily. Report leaks to supervisor immediately. Contain slow drips using a drip tray.
 - b. Do not use excessive grease when greasing vehicle or equipment parts.
- 4 Correct Spillage Handling and Disposal:**
 - a. Clean all spillages immediately. This means treat and remove spillage.
 - b. Dispose in hazardous waste drum or skip.
 - c. Report spillage to supervisor.

DATE:	TIME:	LOCATION:
TOPIC:	Dispensing, storage and disposal of hydrocarbons/ mineral oils	
ISSUE:	Spillage	

USE AND MAINTENANCE OF DRIP TRAYS

TOOLBOX TALK 3:

Definitions, EMPr, and Site Environmental Rules.

ISSUE:

Do's and Don'ts of the Construction Site.

What is a Drip Tray?

A drip tray is a plastic or metal container that can be used to contain a liquid. A container is suitable to be used as a drip tray, if

- It is heavy enough not to be blown away;
- Has no holes in the base or side from which a liquid could leak; and
- The sides are high enough that the liquid will not overflow.

The drip tray must be sized according to the amount of liquid that needs to be captured and contained.

What is the risk?

There is a risk of spillage of hydrocarbons or other chemicals under the following circumstance:

- Various equipment and vehicles may develop slow hydrocarbon leaks (oils);
- During maintenance of vehicles and equipment, there is a risk that hydrocarbons, grease, diesel/petrol may be spilt;
- Refueling of equipment and vehicles;
- During decanting of chemicals such as paint and curing compound etc, some of the chemicals may be spilt on the ground; and/or
- While applying paint or grease you need something to put the tin, paint brush or roller into.
- Temporary storage of chemicals at point of use

Under all these circumstances the correct use of a drip tray could prevent a spillage on to the ground or into water.

What is correct use of a drip tray?

Note that the use of a drip tray should be an additional precaution to other controls. For example:

- Decanting of chemicals should be done within a bunded area as far as possible. A funnel should be used when discharging liquids into a container with a small opening. Spillage of chemicals should always be avoided. A drip tray should be used only as a precaution in case there is a spill.
- Vehicles and equipment should be checked daily and maintained correctly to prevent leaks. Drip trays should be placed underneath equipment and vehicles when stationary as a precaution in case there is a leak.
- Temporary storage of chemicals at point of use. Chemicals should always be returned to chemical store at the end of the shift.
- When refueling vehicles or equipment a drip tray should be used to capture any excess or spillages from the nozzle of the hose. There should be no overfilling of vehicles and equipment.
- Drip trays may be used for the placing of paint brushes and rollers while applying curing compound.

Correct maintenance?

Drip trays should be maintained empty. Drip trays are to be checked daily, cleaned and emptied into the hazardous waste skip. Drip trays that are not being used should be stored under cover to prevent them filling with rain water.

TOPIC:	Use and maintenance of Drip trays
ISSUE:	Drips trays not being used when they should be
	Incorrect maintenance of drip trays resulting in spillages

USE, HANDLING AND STORAGE OF HAZARDOUS CHEMICALS

TOOLBOX TALK 4:

Definitions, EMPr, and Site Environmental Rules.

ISSUE:

Do's and Don'ts of the Construction Site.

What is a Hazardous Chemical?

These are substances that may be dangerous to humans and or the environment if not handled, stored and disposed of correctly. The definition of a hazardous chemical is based on the amount, concentration or inherent properties of the waste.

e.g. Consumption of Alcohol,

Amount – the effect of 1 glass versus 5 litres. It is the same with a chemical. One drop may not be harmful but continuous dripping over a period of a week could be very harmful

Concentration – Beer as opposed to wine, there is alcohol in both but there is more alcohol in the wine than in the beer. It is the same with some chemicals

Inherent properties – Methylated spirits versus Beer, one bottle of methylated spirits could kill you but one beer won't because of the type of alcohol in the beer versus that in methylated spirits. It is the same with some chemicals

What is the risk?

<p>There is a risk of spillage of chemicals under the following circumstance:</p> <ul style="list-style-type: none"> • During decanting of chemicals such as paint and curing compound etc, some of the chemicals may be spilt on the ground; and/or • While applying paint or grease you need something to put the tin, paint brush or roller into. • Temporary storage of chemicals at point of use <p>What are the correct use, handling and storage of hazardous chemicals?</p> <ul style="list-style-type: none"> • Hazardous chemicals should be stored in a roofed, bunded area that is kept locked. Entry of rain water into the bunded area must be prevented. • All chemicals or chemical contaminated items should be stored within the bunded area. NOT on the wall of the bunded area or outside the bunded area on a concrete slab. • Empty chemical containers and drums should be stored in the bunded area until removed or smaller containers thrown in the hazardous waste skip e.g. paint tins, paint brushes or rollers. • Decanting of chemicals should be done within a bunded area as far as possible. A funnel should be used when discharging liquids into a container with a small opening. Spillage of chemicals should always be avoided. • All chemical containers should be labelled. No food related containers are to be used for the storage of chemicals e.g. cool drink bottles. • Temporary storage of chemicals at point of use. Chemicals should always be returned to chemical store at the end of the shift. • Drip trays may be used for the placing of paint brushes and rollers while applying curing compound or shutter oil. • All these chemicals must have an MSDS (material safety data sheet). This information is required to ensure that all chemicals are stored, handled and disposed of in the best possible way to ensure the safety of staff and the environment. <p>Correct maintenance of bunded area</p> <p>Any cracks in the walls or floors and holes in the roof are to be repaired as soon as possible. Bunded area is to be kept free of spillages. Any spillages are to be cleaned up and disposed of as hazardous waste.</p>	
TOPIC:	Use, handling and storage of hazardous chemicals
ISSUE:	Incorrect storage of chemicals
	Spillage of chemicals

<p>WASTE SEGREGATION AND SEPARATION</p> <p>TOOLBOX TALK 5: Definitions, EMPr, and Site Environmental Rules.</p> <p>ISSUE: Do's and Don'ts of the Construction Site.</p> <p>What is waste separation? This is the separation of hazardous and general waste</p> <p>Some examples of hazardous wastes generated on site: Used oils (hydrocarbons), contaminated spill absorbent or sand, paints, batteries (acid), fluorescent tubes (mercury), concrete.</p> <p>Some examples of general waste generated on site: Cool drink bottles, chip packets, plastic, leftover food, paper etc.</p> <p>Correct handling, storage and disposal</p> <ul style="list-style-type: none"> - General waste must be disposed of in the green wheelie bins or marked skips provided - Hazardous waste to be thrown in marked skips provided or 210L marked drums provided in certain areas - The two must not be mixed! - If hazardous waste is found in general waste, all must be disposed of as hazardous waste.
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Why?	
<ul style="list-style-type: none"> - The two waste types are disposed of at different waste dumps. The general waste dump is built only to deal with general waste. Hazardous waste accidentally disposed of here, could pollute the water and harm the people in the area. - Disposal of general waste at a hazardous waste site results in an unnecessary cost to the company, as it is a lot more expensive to dispose of hazardous waste than general waste. 	
What is an incident?	
<ul style="list-style-type: none"> - Mixed waste in any of the skips or bins. 	
TOPIC:	Waste segregation
ISSUE:	Mixing of wastes
	Incorrect disposal of mixed wastes

WASTING DRINKING WATER	
TOOLBOX TALK 6:	
Definitions, EMPr, and Site Environmental Rules.	
ISSUE:	
Do's and Don'ts of the Construction Site.	
What are examples of wasting of drinking water?	
<ul style="list-style-type: none"> - Not turning a tap off properly after use. - Poor maintenance of water fittings resulting in continuous leaking or dripping. - Overfilling and / or overflowing of water containers. 	
Why should we not waste drinking water?	
<ul style="list-style-type: none"> - Good, clean water is scarce in South Africa and expensive to produce and must therefore be used sparingly. Remember anything we put into the water (river, lake or dam) has to be removed before we can drink the water. The more we pollute the water the more expensive it becomes to clean it. 	
Ways to save water:	
<ul style="list-style-type: none"> - Don't drink directly from the tap, rather fill a glass with water, switch the tap off and drink from the glass. - Report any maintenance issues with water fittings or lines, as soon as possible. 	
What is an incident?	
<ul style="list-style-type: none"> - Dripping or leaking taps or water connections. - Overflowing of containers that contain water. 	
TOPIC:	Wasting drinking water
ISSUE:	Scarcity of drinking water
	Expense to produce drinking water

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
GENERAL ADMINISTRATION	<p>SITE INCEPTION</p> <ul style="list-style-type: none"> • An emergency response plan must be available on site as must a copy of the EMPr and the EA. • An incident register must be maintained and kept on site. • A record of training must be maintained and kept on site. • Records proving source of materials must be kept on site. • A record of audits conducted on operations, as well as findings must be kept by the Site Engineer, and findings from audits are to be communicated to the Foreman on site. Proof of communication of findings are to be kept on site. • The site must be sufficiently lit, enabling security and policing should work be required at night. • The following details are to be available at each site: <ul style="list-style-type: none"> ▪ Emergency contact numbers: Name, contact details ▪ Environmental Control Officer: Name, contact details ▪ A list of the sensitive areas identified for that site ▪ Proof of communication of these details to the staff at that particular site. • A hazardous chemical/waste storage area must be provided for, if required. This could be in the form of a leak proof container or suitably sized drip tray. An inventory of goods stored must be maintained and updated weekly. • General waste bins with lids must be provided on site. Accumulated waste must be removed from site regularly and disposed of at a suitably licensed landfill site. • Adequate spill kits and containers for spilled and contaminated material must be provided on site. • Designated areas for stockpiling of raw materials must be identified on site. No stockpiling is to occur on or near slopes or watercourses. All stockpiling areas must be approved by the Site Engineer. • Haulage roads must be identified and demarcated at site set up. Turning areas must be identified and clearly demarcated. Roads may not be located in the designated sensitive areas. • Temporary stormwater protection measures must be established before construction activities commence. <p>All staff are to be trained on their environmental responsibilities before commencing work. All new staff are to be trained before they start work on site. All construction staff will have basic environmental awareness training, which can be conducted at the same time as the required health, & safety training. Training should include (1) the definition of environment (people + air + soil + water +business); (2) reasons for conserving and protecting the environment; (3) how the following activities can impact the environment: - Not using assigned ablutions, hazardous materials, uncleaned spills, mixing of cement or paint on soil or grass surfaces, waste management i.e. use of waste receptacles and waste separation for recycling, vehicle washing polluting soil & ground water; litter; (4) What to do to prevent the above impacting the environment i.e. assign impermeable mixing areas, no vehicle washing on site, use of waste</p>				
SITE CAMP ESTABLISHMENT	<p>SITE INCEPTION</p> <ul style="list-style-type: none"> • The construction camp must be located within the construction site and securely fenced • The construction camp may not be situated on slopes greater than 1:3. • The size of the construction camp must be minimized and must not encroach on any 	<p>CONSTRUCTION</p> <ul style="list-style-type: none"> • A designated waste area must be utilised at all times. Bins must be provided and emptied at no less than monthly intervals. • Chemical toilets, if used, must be located on site and maintained regularly (weekly or bi-weekly). • Storm water control must be maintained. 	<p>POST CONSTRUCTION</p> <ul style="list-style-type: none"> • All building materials and waste must be removed from the site at the end of construction. • Clearance from the ECO must be obtained to ensure the all of the requirements of the EMPr have been complied with. 	<p>OPERATION</p> <ul style="list-style-type: none"> • Not Applicable 	<p>KEY ISSUES</p> <ul style="list-style-type: none"> • Site camp must be established in accordance with all the requirements of the EMPr.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<p>privately owned land without permission.</p> <ul style="list-style-type: none"> • Cut and fill must be avoided where possible during the set-up of the construction camp. • The contractor must attend to drainage of the construction camp to avoid standing water or sheet erosion. • No contaminated runoff or grey water is allowed to be discharged from the construction camp. • Suitable and sufficient waste bins must be provided within the construction camp. • A materials storage area must be identified and designated within the construction camp. • An area for fuel and hazardous chemical storage must be identified if required. This area should be bunded with an impermeable liner or a suitably sized container should be provided as storage space. There should be no bulk fuel storage tanks on site. • Fuel bowzers must be in good condition and be provided with a drip tray for use when dispensing/ refuelling equipment and must be placed under the pump and dispensing unit of the bowser during overnight storage. If possible an undercover area should be provided for overnight storage of the bowser/s. 	<ul style="list-style-type: none"> • Drip trays are to be cleaned out daily and material collected disposed of as hazardous waste. 	<ul style="list-style-type: none"> • Ensure bins and / or skips have been removed from the construction site. • Waybills must be produced showing the removal of waste / spoil / rubble to a registered waste site. • Used oil must be collected by a registered used oil contractor and documentation to this effect has been provided. 		

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<ul style="list-style-type: none"> Decanting of any chemical should be done within the confines of a suitably sized drip tray. Decanting from large containers (e.g. 210 L drums) should be done using a hand pump, where possible. Storage areas/containers containing hazardous substances / materials must be clearly signed and fire extinguishers must be located in close proximity. Suitable spill kits for all stationary machinery must be available at the Site Camp, and within the site. Only emergency (breakdown where equipment is no longer mobile) and minor maintenance (e.g. greasing) may be done on site. Any other planned or required maintenance must be done offsite at a suitable location. 				
VEGETATION CLEARING & ENVIRONMENTALLY SENSITIVE AREAS	<ul style="list-style-type: none"> The Contractor is responsible for informing all employees about the need to prevent any harmful effects on indigenous vegetation on or around the construction site as a result of their activities. Workers should be informed of the areas of important indigenous vegetation and the importance of protecting these. Pesticides and herbicides may not be used on the construction site. Removal of any alien 	<ul style="list-style-type: none"> Care must be taken to avoid the introduction of alien plant species to the site. Alien vegetation re-growth must be controlled throughout the entire site during the construction period. All areas that have been stripped of vegetation, including the roadsides, should be dampened periodically to avoid excessive dust. No dumping of the removed vegetation is permitted in the surrounding properties. 	<ul style="list-style-type: none"> Rehabilitation of areas disturbed by construction activities or earthworks must commence immediately after the completion of construction activities. The site must be rehabilitated with species indigenous to the site. Ensure that no sensitive habitats have been permanently damaged during the construction phase. Where sensitive environmental areas have been damaged these must be reported to the ECO and 	<ul style="list-style-type: none"> The watercourse must not be used as a waste dumping site or wash area. 	<ul style="list-style-type: none"> Only vegetation directly within the project footprint may be removed. No other vegetation surrounding the site may be impacted on.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<p>vegetation should be done by hand where possible.</p> <ul style="list-style-type: none"> Only vegetation directly impacted by the road upgrade may be removed. All sensitive areas must be protected from erosion and direct or indirect spills of pollutants, e.g. sediment, refuse, sewage, cement, oils, fuels, chemicals, wastewater etc. 	<ul style="list-style-type: none"> In the event of a spill, the Contractor must take prompt action to clear polluted areas and prevent spreading of the pollutants. The Contractor must be liable to arrange for professional service providers to clear affected areas, if required. The Contractor must submit a method statement to the RE for approval, detailing the location of the temporary bypasses, spill prevention measures, erosion and sedimentation control measures, surface water flow diversion, reinstatement, etc. 	<p>procedures for rehabilitation of these habitats must be undertaken.</p>		
STORMWATER	<ul style="list-style-type: none"> There should be limited storage of sand and cement on the site as this could contaminate stormwater during construction. All potential stormwater contaminants must be bunded in the site camp to prevent run-off into the surrounding environment. A drainage system must be established for the construction camp. The drainage system must be regularly checked to ensure an unobstructed water flow. Establish cut off drains and berms to reduce stormwater flow through the construction site. As there are no formal stormwater drainage facilities on site, the contractor must prepare a Stormwater Control Plan to ensure that all construction methods adopted on site do not cause, or precipitate, soil erosion. 	<ul style="list-style-type: none"> Any runoff from the construction site must not be allowed to cause excessive erosion or sediment input into the surrounding environment. Flow of stormwater must not be impeded during construction. Contamination of stormwater must be avoided at all times. A drainage system must be established for the construction camp. The drainage system must be regularly checked to ensure an unobstructed water flow. The use of high velocity stormwater pipelines should be avoided in favour of open, high friction, semi-permeable channels wherever feasible. During construction unchannelled flow must be controlled to avoid soil erosion. Where large areas of soil are left exposed, rows of straw / hay or bundles of cut vegetation should be dug into the soil in contours to slow surface wash and 	<ul style="list-style-type: none"> The stormwater infrastructure must be maintained to ensure accumulation debris does not impede water flow. 	<ul style="list-style-type: none"> Stormwater control measures will need to be implemented to ensure water runoff does not cause erosion to the surrounding environment. 	<ul style="list-style-type: none"> Stormwater must be controlled before it is released into the surrounding areas.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	The designated responsible person on site, as indicated in the stormwater control plan (usually the contractor) must ensure that no construction work takes place before the stormwater control measures are in place.	capture eroded soil. The spacing between rows will be dependent on the slope. <ul style="list-style-type: none"> Any incidents involving stormwater contamination must be reported to the ECO for the purposes of maintaining the site's incident records. The stormwater control plan must be adhered to at all times. 			
CONSTRUCTION MATERIAL (SOURCING AND STOCKPILING)	<ul style="list-style-type: none"> Contractors must prepare a source statement indicating the sources of all materials (including topsoil, sands, indigenous gravels, crushed stone etc.). Where possible, a signed document from the supplier of natural materials must be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation. Any mined material must be from a licensed and permitted site. Suppliers must be able to provide permits for the quarry where material has been mined from. Stockpiles must be positioned and sloped to create the least visual impact. 	<ul style="list-style-type: none"> Ensure that all materials are sourced from those sites set out in the source statement and that any changes to sources of materials are updated and approved by the ECO. Make certain transportation of materials is such that no spillage occurs on route to the site. The designated storage area must be secured to keep people and animals out. This area should be located in or near the construction camp enclosure. General building/other materials include non-hazardous materials and chemicals. These must be kept in a designated area. Materials must be stacked in a way that they cannot fall and cause injury or damage to property or the surrounding environment. Stockpiles must not exceed 2m in height and must be covered if exposed to heavy wind or rain. Alternatively, low walls or berms must be constructed around the stockpiles 	<ul style="list-style-type: none"> Ensure that areas where materials are sourced are rehabilitated to ensure no erosion or degradation of the surrounding area occurs. All residual stockpiles must be removed to spoil or spread on site as directed by the ECO. All leftover building materials must be removed from the site. No foreign material generated / deposited during construction must remain on site. Areas affected by stockpiling must be reinstated to the satisfaction of the RE and ECO. 	<ul style="list-style-type: none"> Not Applicable. 	<ul style="list-style-type: none"> Review of source materials lists. Approve any changes in material sources with ECO first. Stockpiles must be located at least 50 m away from the edge of any watercourse and outside the 1:100 year flood line. The furthest threshold must be adhered to.
WATER USE AND CEMENT BATCHING	<ul style="list-style-type: none"> Water used on site must be from an approved source. Should the water be extracted from a 	<ul style="list-style-type: none"> Water use on the site must be recorded and monitored. 	<ul style="list-style-type: none"> All excess concrete must be removed from site on completion of works and disposed of. Washing of 	<ul style="list-style-type: none"> Not Applicable. 	<ul style="list-style-type: none"> Water may only be used from an approved natural

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<p>natural source (river), a water use permit must be acquired from DWS.</p> <ul style="list-style-type: none"> • Topsoil must be stored on a level area to prevent erosion. • If large quantities of concrete is required then it should be trucked in and discharge directly to areas where it may be needed. • No topsoil may be removed from site. 	<ul style="list-style-type: none"> • Stone chip / gravel excess must not be left on site. This must be swept / raked into piles and removed to an area approved by the ECO. • Concrete mixing directly on the ground must not be allowed and must take place on impermeable surfaces to the satisfaction of the ECO. • Designated concrete mixing areas and storage areas for any hazardous materials will be assigned; cement mixing will not be permitted to where runoff can enter any watercourse. • During construction, waste reduction must be targeted and recycled building materials should be used where possible. • Cement mixing must take place on a hard surface or on cement mixing trays. • The concrete batching activities must be located in the site camp only. 	<p>the excess material into the ground or watercourses is not allowed.</p> <ul style="list-style-type: none"> • All excess aggregate must also be removed from site. 		<p>source or from a municipal source.</p> <ul style="list-style-type: none"> • Concrete mixing directly on the ground is prohibited.
CONTAMINATION & WASTE WATER MANAGEMENT	<ul style="list-style-type: none"> • A method statement must be completed by the Contractor and submitted to the ECO showing procedures for dealing with possible emergencies that can occur, such as fire, accidental leaks and spillages. • The Contractor must be in possession of an emergency spill kit that is complete and available at all times on site. The internal EO must be aware of the location of the emergency spill kit and have access to it. • The ECO must be aware of the spillage procedure with regard to 	<ul style="list-style-type: none"> • Should any spills of hazardous materials occur on the site or in the storage area, the relevant clean-up specialists must be contacted immediately. Materials that absorb fuel & oil, such as Drizit or earth should be placed over the spill. This contaminated material must be uplifted, placed within impermeable container and disposed of at a recognized disposal site. • Environment surrounding the watercourse crossings must be protected from any contamination. • An incident record must be completed for all spills. 	<ul style="list-style-type: none"> • No evidence of spills must be evident after construction. • Any damage to sensitive areas, due to spillages occurring during the construction period, must be remediated. • Ensure clean up and rehabilitation of areas where any waste water spillage has occurred. 	<ul style="list-style-type: none"> • No contaminated waste water is allowed to enter any watercourse. 	<ul style="list-style-type: none"> • Correct procedures followed and records to be compiled. • Protection of the indigenous vegetation from contamination. • Waste water must either be collected for removal or no washing should occur on site.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<p>spillages of hazardous or potentially hazardous substances.</p> <ul style="list-style-type: none"> • Adequate wastewater collection facilities must be provided • The Contractor must submit a method statement to the ECO detailing how wastewater would be collected from all wastewater generating areas, as well as storage and disposal methods. • No contaminated runoff or grey water may be discharged from the site camp. • Portable toilets must be situated outside of all sensitive areas. • A maintenance plan for the servicing of these toilets must be drawn up and strictly adhered to, to prevent malfunctioning and neglect resulting in environmental contamination. 	<ul style="list-style-type: none"> • In the event of a spillage that cannot be contained and which poses a serious threat to the local environment, the following Departments must be informed of the incident in accordance with Section 30 of the National Environmental Management Act, Act 107 of 1998, within forty-eight (48) hours: <ul style="list-style-type: none"> • DFFE; • The Local Authority; • Department of Water and Sanitation; • The Local Fire Department when relevant; and • Any other affected departments. • The chemical toilets servicing the camp must be maintained in a good state, and any spills or overflows must be attended to immediately by a sanitation expert. • No waste water must be allowed to runoff into the watercourses or into the indigenous vegetation areas. • No vehicle equipment washing should be conducted on site. • Toilet waste to be removed by an approved contractor and safe disposal certificates must be available on request. • Drip trays must be made available for all construction vehicles and hazardous chemical/substances bought on to the construction site. • Drip trays must be cleaned out daily and material collected disposed of as hazardous waste. 			

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
		<ul style="list-style-type: none"> An incident record must be completed for all spills that do occur. Minor incidents will include small spills of less than 5l that do not enter the stormwater drains, housekeeping issues and general small non compliances with the requirements of the EMPr. The list of incidents to be included in the reporting to the authorities. Major incidents are those that as per section 2.6 of this EMPr must be reported to the authorities, which include all incidents involving contamination of the stormwater or other reportable incidents as defined in 2.6. <p>Minor incidents: small spills less than 5l that do not enter stormwater, minor non-compliance with EMPr that does not cause major environmental impact i.e. Housekeeping issues etc.</p> <p><u>Action:</u> Supervisor and staff on site to record and address and notify ECO. ECO to advise on remediation measures and to follow up on actions taken to address incident.</p> <p><u>Records:</u> On site incident register.</p> <p>Major incidents: Large spills or any spills that enter stormwater, contamination of soil fires, explosions. Please see definition of a reportable incident provided below.</p> <p><u>Action:</u> Report immediately to ECO, action to be taken to prevent further damage and incident to be reported to authorities. ECO to advise on remediation measures and to follow up on actions taken to address incident.</p>			

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
		Records: On site incident register and report to authorities as listed above.			
WASTE MANAGEMENT	<ul style="list-style-type: none"> Waste must be disposed at the appropriate landfill site by an approved contractor. Safe disposal certificates will be obtained and kept on site. The excavation of rubbish pits on site is not allowed. Burning of rubbish on site is not allowed. Recycling bins must be placed within the construction site to ensure all materials are properly sorted for recycling. 	<ul style="list-style-type: none"> The construction rubble must be disposed in designated spoil dumps, demarcated by the Engineer. Refuse must be separated at source and disposed of in the appropriate bins, which must be emptied regularly. Littering is prohibited and the site must be cleaned daily. All solid waste generated during the construction process (including packets, plastic, rubble, cut plant material, waste metals etc.) must be placed in the waste collection area in the construction camp and must not be allowed to blow around the site, be accessible by animals, or be placed in piles adjacent the skips / bins. Hazardous waste such as oils, contaminated rags etc must be disposed of at a hazardous class landfill. A separate drum must be available for storage of contaminated soil. Recycling must be undertaken to limit waste added to the landfill site. 	<ul style="list-style-type: none"> No litter must be left on site All bins and other waste storage are removed from site. A final check must be done to ensure that no waste is left on site. Burying of rubble on site is prohibited. Surfaces are to be checked for waste products from activities such as concreting and cleared in a manner approved by the ECO. The Contractor is to check that the stormwater channels and the drainage pipes are free from building rubble, spoil materials and waste materials. 	<ul style="list-style-type: none"> Maintenance personnel must undergo an induction programme to ensure compliance with operational phase requirements of the EMP. Littering on site is prohibited and the site must be cleaned daily. 	<ul style="list-style-type: none"> Recycling to be conducted onsite. Bins must be located at adequate intervals in the construction area.
HAZARDOUS STORAGE AND DISPOSAL	<ul style="list-style-type: none"> Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes. 	<ul style="list-style-type: none"> Hazardous materials to be stored separately. All hazardous chemicals to be returned to the storage area at the site camp each night. Fuel storage areas must be bunded with a catch pit of at least 110% the storage capacity of the fuel storage container. This bund must have a controlled stormwater outlet with a filter. A full inventory of hazardous substances and MSDS for each 	<ul style="list-style-type: none"> Hazardous materials that require disposal (cement, paints, solvents, old fuel / oil etc.) must be disposed of to a registered hazardous landfill site. These materials may be removed by an appropriate hazardous waste contractor. Proof of appropriate disposal must be available to the ECO for scrutiny and kept on record. 	<ul style="list-style-type: none"> Not Applicable. 	<ul style="list-style-type: none"> Hazardous materials must always be stored on a hard-surfaced (impermeable), bunded, secure and undercover area.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<ul style="list-style-type: none"> • Ensure all staff are trained on proper hazardous waste disposal. • Hazardous storage areas to be hard surfaced and bunded with an impermeable liner to protect groundwater quality and undercover. The Contractor must submit a method statement to this effect to the Engineer for approval. • Hazardous storage areas must not be located near any indigenous vegetation areas. • Storage areas containing hazardous substances/materials must be clearly signed. • The hazardous materials storage area must be fully secured to prevent people and animals from accessing it. • Hazardous material storage areas must not be within 50 m of any watercourse or within the 1:100 year flood line. The furthest threshold must be adhered to. 	<p>substance stored on site must be maintained, with each substance being stored and managed in accordance with the MSDS.</p> <ul style="list-style-type: none"> • Concrete waste must be disposed of at an appropriate waste site. • Do not mix hazardous materials and other demolition materials. • A separate drum should be available for storage of contaminated soil. • Staff dealing with these materials/substances must be aware of their potential impacts and follow the appropriate safety measures. • Transport of hazardous materials around the site should be limited, and materials must be transported in sealed bags/containers. • Mixing/decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these should then be disposed of to a suitable waste site. • Decanting of any chemical should be done within the confines of a suitably sized drip tray. • Decanting from large containers (e.g. 210 L drums) must be done using a hand pump. • Firefighting equipment to be kept near material storage area. • Drip trays are to be cleaned out daily and material collected and disposed of as hazardous waste. 			
EROSION CONTROL & AIR QUALITY MANAGEMENT	<ul style="list-style-type: none"> • The Contractor must, as an initial and on-going exercise, implement erosion and 	<ul style="list-style-type: none"> • Stabilisation of cleared areas to prevent and control erosion and/or 	<ul style="list-style-type: none"> • In areas where construction activities have been completed and where no further disturbance would 	<ul style="list-style-type: none"> • Areas that have been rehabilitated must be maintained and monitored 	<ul style="list-style-type: none"> • Cleared areas must have erosion control measures implemented.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<p>sedimentation control measures to the satisfaction of the ECO.</p> <ul style="list-style-type: none"> The contractor must ensure that the necessary equipment is in place to control dust generated during construction. 	<p>sedimentation must be actively managed.</p> <ul style="list-style-type: none"> During construction, the Contractor must protect all areas susceptible to erosion by installing necessary temporary drainage systems as soon as possible and by taking any other measures necessary to prevent stormwater from concentrating in streams and scouring slopes, banks, etc. Damage to stabilised areas must be repaired and maintained to the satisfaction of the ECO. Bank stabilization must occur in order to prevent collapse of these steep embankments Vehicles travelling along disturbed areas must adhere to speed limits to avoid creating excessive dust. Dust suppression techniques must be adopted to control dust generated during construction (e.g. keep dusty areas watered, compact stockpiled soil, construct physical barriers, and control traffic on site). A complaints register must be maintained on site at all times and be made accessible to the surrounding community (or any affected person(s)) to record complaints regarding odours, emissions and/or excessive levels of dust. Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption etc. 	<p>take place, rehabilitation and re-vegetation should commence as soon as possible.</p> <ul style="list-style-type: none"> Re-vegetation of cleared land must utilize only 100% locally indigenous plant material to ensure no erosion occurs once the site is vacated. Any eroded soil on paths / roadways / other areas must be collected and replaced in the area from which it was eroded. 	<p>to ensure infestation by alien vegetation does not occur.</p> <ul style="list-style-type: none"> Indigenous vegetation utilised in the rehabilitation process must not be used for medicinal purposes. 	<ul style="list-style-type: none"> Any eroded sections must be stabilised. Controls must be implemented to avoid dust generated during construction.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
TRAINING AND CONDUCT	<ul style="list-style-type: none"> The ECO must ensure that the Engineer and site agents have sufficient understanding of environmental issues to pass this information on to the construction staff. The site manager must ensure that all direct and sub-contracted site personnel have a basic level of environmental awareness training and this has been offered to them in English and Afrikaans/Sesotho. The Engineer / Environmental Control Officer must be on hand to explain more difficult / technical environmental issues and to answer questions at project commencement. The need for a “clean site” policy must be explained to construction workers. The Environmental Control Officer (ECO) must ensure that all site staff are informed of the details of the EMPr document as well as the conditions of the Environmental Authorisation issued by DEA. Workers must be shown any indigenous vegetation areas and must be informed of the importance of ensuring this area is not impacted on. Workers must be briefed by the person in charge of managing 	<ul style="list-style-type: none"> No fires are allowed on site. Regular toolbox sessions must be held to ensure that staff are reminded about environmental and safety issues and procedures. No fires may be made on the property. Workers that are under the influence of alcohol or drugs may not operate chainsaws, vehicles or other machinery. The harvesting of firewood, medicinal plants, tree bark, flowers or other natural materials is forbidden on the site and adjacent properties. No hunting, killing or harassing of any animals may occur. No workers may sleep on the property unless proper accommodations for this have been established. Prior to the commencement of construction, all workers need to know what possible archaeological or historical objects of value may look like, and to notify the site manager if one is found. 	<ul style="list-style-type: none"> Any damage caused by misconduct must be remedied and rehabilitated. 	<ul style="list-style-type: none"> All maintenance personnel must be made aware of the operational requirements of this EMPr. It is recommended that maintenance personnel undergo an induction programme regarding the requirements of the EMPr. 	<ul style="list-style-type: none"> Workers must be briefed on the requirements of the EMPr. Regular toolbox sessions are to be held in order to remind staff about environmental and safety issues.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<p>construction / management activities on the do's and don'ts on the site, when workers arrive at site. This must be repeated in weekly toolbox talks.</p> <ul style="list-style-type: none"> • No alcohol, drugs, snares, slingshots or animals may be brought onto the property. • Adequate toilets must be available on site for use by construction staff at all times. • The digging of pit latrines is not allowed under any circumstances. • None of the open areas or the surrounding environment may be used as a toilet facility. 				
EQUIPMENT MAINTENANCE AND VEHICLE WASHBAY	<ul style="list-style-type: none"> • Machinery and vehicles must be well maintained but no maintenance work will be carried out on site. • Excessively noisy machinery must be removed from site. • All machinery servicing areas must be bunded. 	<ul style="list-style-type: none"> • All vehicles and equipment must be kept in good working order to maximize efficiency and minimize pollution. • All maintenance, including washing and repairs of plant on site must take place off site. • Washing of equipment must be conducted offsite where grey water can be collected or disposed, unless adequate collection facilities are available onsite. • The Contractor must ensure that no contamination of soil or vegetation occurs. • Drip trays must be used to collect used oil, lubricants, etc. during minor maintenance. • Drip trays must be provided for all stationary plant. 	<ul style="list-style-type: none"> • Used oil, lubricants, cleaning materials, etc. to be disposed of at a DWS approved hazardous waste site, safe disposal certificates to be obtained. 	<ul style="list-style-type: none"> • No washing of vehicles is permitted in the vicinity of any watercourse. 	<ul style="list-style-type: none"> • All machinery maintenance, must take place off site. • Drip trays must be provided for all stationary plant. • Washing of machines and equipment must be conducted offsite.

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
OCCUPATIONAL HEALTH & SAFETY AND EMERGENCY RESPONSE	<ul style="list-style-type: none"> All construction staff must be provided with relevant Personal Protective Equipment (PPE). All construction staff must be made aware of emergency phone numbers to use in the case of an emergency. All staff must be trained on how to react in the case of an emergency. An emergency response team must be set up to manage emergencies. 	<ul style="list-style-type: none"> The necessary PPE must be worn. Firefighting equipment to be installed and fire teams must be trained accordingly. Material stockpiles must be stable and well secured to avoid collapse and possible injury to workers. Staff handling hazardous substances/materials must be aware of their potential impacts and follow appropriate safety measures. Keep clearly marked absorbent material on site to contain spills if they occur. If a spill occurs, stop the source, contain it, clean up in accordance with MSDSs and notify relevant authorities. 	<ul style="list-style-type: none"> Staff handling hazardous substances/materials must be aware of their potential impacts and follow appropriate safety measures. 	<ul style="list-style-type: none"> Not Applicable 	<ul style="list-style-type: none"> Emergency phone numbers and responsible persons must be indicated. The necessary PPE must be worn.
TRAFFIC, ACCESS, ROADS AND EQUIPMENT	<ul style="list-style-type: none"> All access points must be agreed by the engineer and ECO prior to commencement of construction. No ad hoc haulage roads or turning areas may be created. Clear signage relating to traffic and speed limits must be erected prior to construction. 	<ul style="list-style-type: none"> Stop/Go control must be implemented. Construction sections should be limited to 4km, with a minimum of 4km between two consecutive work areas. In the event that a major intersection is located between two Stop/Go control points within a section under construction, an additional Stop/Go control point will be required at such an intersection. Legal speed limits must be maintained at all times. Noise suppressors must be used on machinery on site. Workers will be trained regarding noise on site and construction hours will be kept to working hours (07h00 to 17h00). 	<ul style="list-style-type: none"> All temporary signage must be removed on completion of construction. All existing access roads to and from the construction site must be cleared. 	<ul style="list-style-type: none"> Not Applicable. 	<ul style="list-style-type: none"> Pointsmen / flagsmen and stop/go control must be used to control traffic during construction.
DECOMMISSIONING	<p>A detailed decommissioning plan must be submitted to DFFE for approval at least 30 days prior to the decommissioning of the facility. The plan must address the following:</p> <ul style="list-style-type: none"> Soil erosion Waste management 				

	SITE INCEPTION	CONSTRUCTION	POST CONSTRUCTION	OPERATION	KEY ISSUES
	<ul style="list-style-type: none"> ▪ Waste water management ▪ Stormwater management ▪ Worker conduct ▪ Dust ▪ Re-vegetation, stabilisation and rehabilitation ▪ Land contamination ▪ Complaints register <p>Prior to decommissioning the surrounding community must be notified. Decommissioning must take place only during working hours. All solid waste and rubble must be disposed of at an approved landfill site. No waste is allowed to contaminate any watercourse. Any wash water must be treated as contaminated and is not permitted to enter stormwater drains and run-off into the any watercourses. Rehabilitation measures must be put into place. All structures, foundations, concrete and tarred areas are demolished. Rubble must be removed by an approved contractor and taken to a licensed landfill site. Waste recycling must be encouraged. A long-term monitoring system must be in place to ensure total rehabilitation of the site following decommissioning.</p>				

APPENDIX 8: TRAINING RECORD

This is record of training carried out on site.

Training Topic: _____

Training Topic Details

Training Attendance	
Name	Signature

Training Provider: _____
Name

Signature

Date

APPENDIX 9: EAP CURRICULUM VITAE

Appendix C2:

Generic Substation Environmental Management Programme



GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE
DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE FOR THE
TRANSMISSION AND DISTRIBUTION OF ELECTRICITY

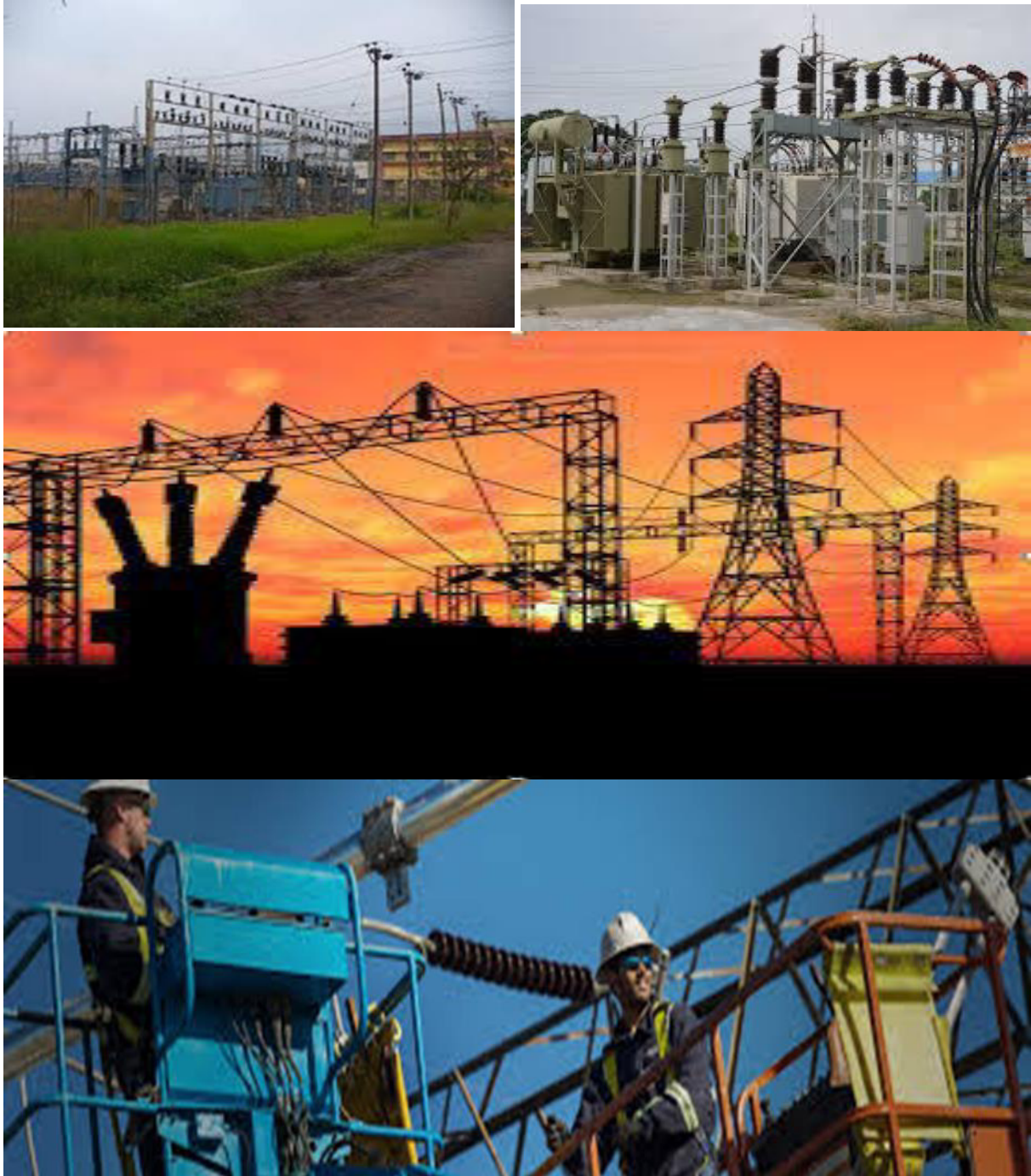


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INTRODUCTION

1. Background

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended (EIA Regulations) or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including but not limited to the applicant and the competent authority (CA).

2. Purpose

This document constitutes a generic EMPr relevant to applications for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and all listed and specified activities necessary for the realisation of such infrastructure.

3. Objective

The objective of this generic EMPr is to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature.

4. Scope

The scope of this generic EMPr applies to the development or expansion of substation infrastructure for the transmission and distribution of electricity requiring EA in terms of NEMA. This generic EMPr applies to activities requiring EA, mainly activity 11 and 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and activity 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, as amended, and all associated listed or specified activities necessary for the realization of such infrastructure.

5. Structure of this document

This document is structured in three parts with an Appendix as indicated in the table below:

Part	Section	Heading	Content
A		Provides general guidance and information and is not legally binding	Definitions, acronyms, roles & responsibilities and documentation and reporting.
B	1	Pre-approved generic EMPr template	<p>Contains generally accepted impact management outcomes and impact management actions required for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity, which are presented in the form of a template that has been pre-approved.</p> <p>The template in this section is to be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity.</p> <p>Where an impact management outcome is not relevant, the words “not applicable” can be inserted in the template under the “responsible persons” column.</p> <p>Once completed and signed, the template represents the EMPr for the activity approved by the CA and is legally binding. The template is not required to be submitted to the CA as once the generic EMPr is gazetted for implementation, it has been approved by the CA.</p> <p>To allow interested and affected parties access to the pre-approved EMPr template for consideration through the decision-making process, the EAP on behalf of the applicant /proponent must make the hard copy of this EMPr available at a public location and where the applicant has a website, the EMPr should also be made available on such publicly accessible website.</p>
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA

Part	Section	Heading	Content
			<p>will comply with the pre-approved generic EMPr template contained in <u>Part B: Section 1</u>, and understands that the impact management outcomes and impact management actions are legally binding. The preliminary infrastructure layout must be finalized to inform the final EMPr that is to be submitted with the basic assessment report (BAR) or environmental impact assessment report (EIAR), ensuring that all impact management outcomes and impact management actions have been either pre-approved or approved in terms of <u>Part C</u>.</p> <p>This section must be submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of <u>Part B: section 2</u> not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.</p>
C		Site specific sensitivities/ attributes	<p>If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (<u>Part B: section 1</u>)</p> <p>This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if <u>Part C</u> is applicable to the site, it is required to be submitted together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The</p>

Part	Section	Heading	Content
			<p>information in this section must be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. Once approved, Part C forms part of the EMPr for the site and is legally binding.</p> <p>This section applies only to additional impact management outcomes and impact management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not already included in <u>Part B: section 1</u>.</p>
		Appendix 1	<p>Contains the method statements to be prepared prior to commencement of the activity. The method statements are not required to be submitted to the competent authority.</p>

6. Completion of part B: section 1: the pre-approved generic EMPr template

The template is to be completed prior to commencement of the activity, by providing the following information for each environmental impact management action:

- For implementation
 - a 'responsible person',
 - a method for implementation,
 - a timeframe for implementation
- For monitoring
 - a responsible person
 - frequency
 - evidence of compliance.

The completed template must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must be signed and dated on each page by the holder of the EA. This template once signed and dated is legally binding. The holder of the EA will remain responsible for its implementation.

7. Amendments of the impact management outcomes and impact management actions

Once the activity has commenced, a holder of an EA may make amendments to the impact management outcomes and impact management actions in the following manner:

- Amendment of the impact management outcomes: in line with the process contemplated in Regulation 37 of the EIA Regulations; and
- Amendment of the impact management actions: in line with the process contemplated in Regulation 36 of the EIA Regulations.

8. Documents to be submitted as part of part B: section 2 site specific information and declaration

Part B: Section 2 has three distinct sub-sections. The first and third sub-sections are in a template format. Sub-section two requires a map to be produced.

Sub-section 1 contains the project name, the applicant's name and contact details, the site information, which includes coordinates of the property or farm in which the proposed substation infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

Sub-section 2 is to be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout using the national web based environmental screening tool, when available for compulsory use at: <https://screening.environment.gov.za/screeningtool>. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features and within 50 m from the development footprint.

Sub-section 3 is the declaration that the applicant (s)/proponent (s) or holder of the EA in the case of a change of ownership must complete which confirms that the applicant/EA holder will comply with the pre-approved 'generic EMPr' template in Section 1 and understands that the impact management outcomes and impact management actions are legally binding.

(a) Amendments to Part B: Section 2 – site specific information and declaration

Should the EA be transferred, Part B: Section 2 must be completed by the new applicant/proponent and submitted with the application for an amendment of the EA in terms of regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted as part of such an application for an amendment to an EA will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART A – GENERAL INFORMATION

1. DEFINITIONS

In this EMPr any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"clearing" means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"construction camp" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"contractor" - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"hazardous substance" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"method statement" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

The method statement must cover as a minimum applicable details with regard to:

- (i) Construction procedures;
- (ii) Plant, materials and equipment to be used;
- (iii) Transporting the equipment to and from site;
- (iv) How the plant/ material/ equipment will be moved while on site;
- (v) How and where the plant/ material/ equipment will be stored;
- (vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- (vii) Timing and location of activities;
- (viii) Compliance/ non-compliance; and
- (ix) Any other information deemed necessary by the Project Manager.

“**slope**” means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units;

“**solid waste**” means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

“**spoil**” means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

“**topsoil**” means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil;

“**works**” means the works to be executed in terms of the Contract

2. ACRONYMS and ABBREVIATIONS

CA	Competent Authority
cEO	Contractors Environmental Officer
dEO	Developer Environmental Officer
DPM	Developer Project Manager
DSS	Developer Site Supervisor
EAR	Environmental Audit Report
ECA	Environmental Conservation Act No. 73 of 1989
ECO	Environmental Control Officer
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ERAP	Emergency Response Action Plan
EMPr	Environmental Management Programme Report
EAP	Environmental Assessment Practitioner
FPA	Fire Protection Agency
HCS	Hazardous chemical Substance
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act ,2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
MSDS	Material Safety Data Sheet
RI&AP's	Registered Interested and affected parties

3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION

The effective implementation of this generic EMPr is dependent on established and clear roles, responsibilities and reporting lines within an institutional framework. This section of the EMPr gives guidance to the various environmental roles and reporting lines, however, project specific requirements will ultimately determine the need for the appointment of specific person(s) to undertake specific roles and or responsibilities. As such, it must be noted that in the event that no specific person, for example, an environmental control officer (ECO) is appointed, the holder of the EA remains responsible for ensuring that the duties indicated in this document for action by the ECO are undertaken.

Table 1: Guide to roles and responsibilities for implementation of an EMPr

Responsible Person(s)	Role and Responsibilities
Developer's Project Manager (DPM)	<p><u>Role</u> The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.

Responsible Person(s)	Role and Responsibilities
Developer Site Supervisor (DSS)	<p><u>Role</u> The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	<p><u>Role</u> The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr.</p> <p>The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested & Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a</p>

Responsible Person(s)	Role and Responsibilities
	<p>variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required.</p> <p><u>Responsibilities</u></p> <p>The responsibilities of the ECO will include the following:</p> <ul style="list-style-type: none"> - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken;

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
developer Environmental Officer (dEO)	<p><u>Role</u></p> <p>The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor’s Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports;

Responsible Person(s)	Role and Responsibilities
	<ul style="list-style-type: none"> - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	<p><u>Role</u></p> <p>The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.

Responsible Person(s)	Role and Responsibilities
contractor Environmental Officer (cEO)	<p><u>Role</u> Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria:</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place for all substation infrastructure projects as a minimum requirement.

4.1 Document control/Filing system

The holder of the EA is solely responsible for the upkeep and management of the EMPr file. As a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained in the office of the DSS (where applicable). This duplicate file must remain current and up-to-date. The filing system must be updated and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

4.2 Documentation to be available

At the outset of the project the following preliminary list of documents shall be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the CA in terms of NEMA, granting approval for the development or expansion;
- Copy of the generic and site specific EMPr as well as any amendments thereof;
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Complaints register.

4.3 Weekly Environmental Checklist

The ECOs are required to complete a Weekly Environmental Checklist, the format of which is to be agreed prior to commencement of the activity. The ECOs are required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the DSS on a weekly basis.

The checklists will form the basis for the Monthly Environmental Reports. Copies of all completed checklists will be attached as Annexures to the Environmental Audit Report as required in terms of the EIA Regulations.

4.4 Environmental site meetings

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

4.5 Required Method Statements

The method statement will be done in such detail that the ECOs are enabled to assess whether the contractor's proposal is in accordance with the EMPr.

The method statement must cover applicable details with regard to:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the Project Manager, the Contractor shall provide the following method statements to the Project Manager no less than 14 days prior to the commencement date of the activity:

- Site establishment – Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Batch plants;
- Workshop or plant servicing;
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

The ECOs shall monitor and ensure that the contractors perform in accordance with these method statements. Completed and agreed method statements between the holder of the EA and the contractor shall be captured in Appendix 1.

4.6 Environmental Incident Log (Diary)

The ECOs are required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance notice would not be issued. An environmental incident is defined as:

- Any deviation from the listed impact management actions (listed in this EMPr) that may be addressed immediately by the ECOs. (For example a contractor's staff member littering or a drip tray that has not been emptied);
- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMPr which as a single event would have a minor impact but which if cumulative and continuous would have a significant effect (for example no toilet paper available in the ablutions for an afternoon); and
- General environmental information such as road kills or injured wildlife.

The ECOs are to record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the Developer. The Log is to be kept in the EMPr file and at a minimum the following will be recorded for each environmental incident:

- The date and time of the incident;
- Description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice must be issued, and recorded in the log;
- Remedial or corrective action taken to mitigate the incident; and
- Record of repeat minor offences by the same contractor or staff member.

The Environmental Incident Log will be captured in the EAR.

4.7 Non-compliance

A non-compliance notice will be issued to the responsible contractor by the ECOs via the DSS or Project Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice.

Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant CA for them to deal with the transgression, as it deems fit. The contractor is deemed not to have complied with the EMPr if, inter alia, There is a deviation from the environmental conditions, impact management outcomes and impact management actions activities, as approved in generic and site specific EMPr as relevant as set out in the EMPr, which deviation has, or may cause, an environmental impact.

4.8 Corrective action records

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the DSS, the contractor's cEO will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the cEO is to issue a Corrective Action Report in writing to the ECOs. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECOs.

4.9 Photographic record

A digital photographic record will be kept. The photographic record will be used to show before, during and post rehabilitation evidence of the project as well used in cases of damages claims if they arise. Each image must be dated and a brief description note attached.

The Contractor shall:

1. Allow the ECOs access to take photographs of all areas, activities and actions.

The ECOs shall keep an electronic database of photographic records which will include:

1. Pictures of all areas designated as work areas, camp areas, development sites and storage areas taken before these areas are set up;
2. All bunding and fencing;
3. Road conditions and road verges;
4. Condition of all farm fences;
5. Topsoil storage areas;
6. All areas to be cordoned off during construction;
7. Waste management sites;
8. Ablution facilities (inside and out);
9. Any non-conformances deemed to be "significant";
10. All completed corrective actions for non-compliances;
11. All required signage;
12. Photographic recordings of incidents;
13. All areas before, during and post rehabilitation; and

14. Include relevant photographs in the Final Environmental Audit Report.

4.10 Complaints register

The ECOs shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

1. Record the name and contact details of the complainant;
2. Record the time and date of the complaint;
3. Contain a detailed description of the complaint;
4. Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECO's to take relevant photographs); and
5. Contain a copy of the ECO's written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECOs shall respond as described in **(section 4.11)** below.

4.11 Claims for damages

In the event that a Claim for Damages is submitted by a community, landowner or individual, the ECOs shall:

1. Record the full detail of the complaint as described in **(section 4.10)** above;
2. The DPM will evaluate the claim and associated damage and submit the evaluation to the Senior Site Representative for approval;
3. Following consideration by the DPM, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant. Should the claimant not accept this, the ECO shall, in writing report the incident to the Developer's negotiator and legal department; and
4. A formal record of the response by the ECOs to the claimant as well as the rectification of the method of making payments not amount will be recorded in the EMPr file.

4.12 Interactions with affected parties

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ECOs shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe;
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties; and

4. Ensure that contact with affected parties is courteous at all times;

4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes included in the EMPr file and submitted to the CA at intervals as indicated in the EA.

The ECOs must prepare a monthly EAR. The report will be tabled as the key point on the agenda of the Environmental Site Meeting. The Report is submitted for acceptance at the meeting and the final report will be circulated to the Project Manager and filed in the EMPr file. At a frequency determined by the EA, the ECOs shall submit the monthly reports to the CA. At a minimum the monthly report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Bi-monthly Environmental Site Meetings.

4.14 Final environmental audits

On final completion of the rehabilitation and/or requirements of the EA a final EAR is to be prepared and submitted to the CA. The EAR must comply with Appendix 7 of the EIA Regulations.

PART B: SECTION 1: Pre-approved generic EMPr template

5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

This section provides a pre-approved generic EMPr template with aspects that are common to the development of substation infrastructure for the transmission and distribution of electricity. There is a list of aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs are responsible to ensure the implementation of these outcomes and actions for all projects as a minimum requirement, in order to mitigate the impact of such aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity.

The template provided below is to be completed by providing the information under each heading for each environmental impact management action.

The completed template must be signed and dated on each page by both the contractor and the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must also be duly signed and dated on each page by the contractor and the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

5.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities;	ECO / cEO / dEO	Environmental awareness training workshops	Construction	ECO / dEO	Monthly and as and when required	Attendance register
– The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;	Contractor	Scheduling of sufficient sessions through consultation with the ECO / cEO / dEO	Construction	ECO / dEO	Monthly and as and when required	Attendance register
– Refresher environmental awareness training is available as and when required;	ECO / cEO / dEO	Refresher environmental awareness training workshops	Construction	ECO / dEO	Monthly and as and when required	Attendance register
– All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr;	ECO / cEO / dEO	Ensure that the EA and EMPr is readily available	Construction	ECO / dEO	Monthly and as and when required	Attendance register
– The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering.	Contractor	Place appropriate posters at key locations	Construction	ECO / dEO	Monthly and as and when required	Photographic record
– Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures;	ECO / cEO / dEO	Environmental awareness training material	Construction	ECO / dEO	Monthly and as and when required	Environmental awareness training material requirements checklist

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e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention.						
- A record of all environmental awareness training courses undertaken as part of the EMPr must be available;	cEO / dEO	Environmental Filing system including all proof of training	Construction	ECO / dEO	Monthly and as and when required	Environmental File with proof of training
- Educate workers on the dangers of open and/or unattended fires;	cEO / dEO	Environmental awareness training material	Construction	ECO / dEO	Monthly and as and when required	Environmental awareness training material requirements checklist
- A staff attendance register of all staff to have received environmental awareness training must be available.	cEO / dEO	Environmental Filing system including all proof of training	Construction	ECO / dEO	Monthly and as and when required	Environmental File with proof of training
- Course material must be available and presented in appropriate languages that all staff can understand.	cEO / dEO / ECO	Environmental awareness training material in the required languages	Construction	ECO / dEO	Monthly and as and when required	Environmental File with proof of training in appropriate languages

5.2 Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;	Contractor / cEO	Development a method statement	Pre-Construction	ECO / dEO	Once, prior to construction	Method statement which complies with the minimum requirements listed
– Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through;	DPM / Contractor	Place construction camps outside of sensitive areas	Pre-Construction	ECO / dEO	Once, prior to construction	Layout and sensitivity map indicating avoidance of sensitive areas
– Sites must be located where possible on previously disturbed areas;	DPM / Contractor	Place construction camps outside of sensitive areas	Pre-Construction	ECO / dEO	Once, prior to construction	Layout and sensitivity map indicating avoidance of sensitive areas
– The camp must be fenced in accordance with Section 5.5: Fencing and gate installation; and	DPM & Contractor	Place construction camps outside of sensitive areas	Pre-Construction	ECO / dEO	Once, prior to construction	Layout and sensitivity map indicating avoidance of sensitive areas
– The use of existing accommodation for contractor staff, where possible, is encouraged.	DPM / Contractor	Place accommodation outside of sensitive areas	Pre-Construction	ECO / dEO	Once, prior to construction	Layout and sensitivity map indicating avoidance of sensitive areas

5.3 Access restricted areas

Impact management outcome: Access to restricted areas prevented.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development;	cEO / dEO	Demarcate access restricted areas	Commencement and for the duration of the construction phase	ECO	Continuous	Photographic evidence
– Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate; and	cEO / dEO	Erect appropriate temporary barriers around access restricted areas	Commencement and for the duration of the construction phase	ECO	Continuous	Photographic evidence
– Unauthorised access and development related activity inside access restricted areas is prohibited	cEO / dEO	Erect appropriate temporary barriers around access restricted areas	Commencement and for the duration of the construction phase	ECO	Continuous	Photographic evidence

5.4 Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities;	DPM / Contractor	Access agreements with the affected landowners.	Pre-construction	dEO /ECO	Once, prior to construction	Written and signed agreements
- All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition	Contractor & cEO	Undertake maintenance activities on private roads used for construction	Construction	dEO /ECO	Continuous	Photographic record of access roads tracking condition
- All contractors must be made aware of all these access routes.	Contractor	Provide a map showing all access routes associated with the project	Pre-construction Construction Operation	ECO	Construction	Access routes map available
- Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense;	Contractor	All access routes developed that are not in-line with the access route agreements must be closed and rehabilitated	Construction	ECO	Construction	Photographic record of the closure of access roads and re-vegetation
- Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads;	Contractor	Existing access routes to be used must be specified and the development of new roads must be avoided	Pre-construction Construction Operation	cEO / ECO	Continuous	Implement approved layout

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<p>– In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with section 4.9: photographic record; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor;</p>	<p>dEO / cEO</p>	<p>Record the conditions of private roads to be used as per the requirements of section 4.9 and agree on the required condition of the roads with the landowner, DPM and contractor</p>	<p>Construction</p>	<p>ECO</p>	<p>Prior to road use</p>	<p>Photographic record of the road conditions</p>
<p>– Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands</p>	<p>DPM / Contractor</p>	<p>Design access roads to follow fence lines and avoid vegetated areas</p>	<p>Pre-construction</p>	<p>ECO</p>	<p>Once, prior to construction</p>	<p>Implement approved layout</p>
<p>– Access roads must only be developed on a pre-planned and approved roads.</p>	<p>Contractor</p>	<p>Construction of access roads only on pre-planned and approved roads</p>	<p>Construction</p>	<p>cEO / ECO</p>	<p>Once, prior to construction</p>	<p>Implement approved layout</p>

5.5 Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible;	Contractor	Identify and inform all relevant staff of the existing gates to be used	Pre-construction & Construction	dEO	Monthly	Existing gates are utilised on a frequent basis and only limited new access gates are developed
– Existing and new gates to be recorded and documented in accordance with section 4.9: photographic record;	cEO	Existing and new gates will be recorded and documented as per the requirements of section 4.9	Construction	ECO	Once, when the construction of all new gates have been completed	Photographic record of the existing and new gates as per the requirements of section 4.9
– All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner;	Contractor	Ensure all relevant gates are fitted with locks and are always locked	Construction and Operation	ECO	Continuous	All gates are locked
– At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;	N/A					
– Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground;	Contractor	Install gates in a manner so that there is a gap of no more than 100mm between the bottom of the gate and the ground	Construction	cEO	Once, during the erection of the gates during the construction phase	New gates installed as per the requirement

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- Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate;	Contractor	Implement a reinforced concrete sill beneath gates installed for jackal proofing	Construction	cEO	Once, during the erection of the gates during the construction phase	New gates installed as per the requirement
- Original tension must be maintained in the fence wires;	Contractor	Maintain original tension of fences through required activities	Construction	ECO	Monthly	No tension reduction on fence wires
- All gates installed in electrified fencing must be re-electrified;	Contractor	Electrify gates installed in electrified fencing	Construction	ECO	Once, during the erection of the gates during the construction phase	Gates installed in electrified fencing is electrified
- All demarcation fencing and barriers must be maintained in good working order for the duration of the development activities;	Contractor & cEO	Undertake maintenance activities on fences and barriers	Construction	ECO	Monthly	Photographic record of fences erected
- Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable;	Contractor & cEO	Fence construction camps, batching plants, hazardous storage areas and access restricted areas. Avoid sensitive flora	Construction	ECO	Once during the erection of fencing	Photographic record of fences erected
- Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner.	dEO/ cEO & Contractor	Obtain written approval from the relevant landowner where temporary fencing is required to restrict livestock movement	Construction	ECO	To be monitored as temporary fencing is required	Written approval to be provided by the dEO

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<p>- All fencing must be developed of high quality material bearing the SABS mark;</p>	<p>Contractor</p>	<p>Make use of high-quality materials approved by SABS</p>	<p>Construction</p>	<p>cEO</p>	<p>To be monitored as fencing is erected during the construction phase</p>	<p>Use of high-quality materials for fencing approved by SABS</p>
<p>- The use of razor wire as fencing must be avoided;</p>	<p>Contractor</p>	<p>Razor wire must not be sourced or used for the erection of fencing</p>	<p>Construction</p>	<p>ECO</p>	<p>To be monitored as fencing is erected during the construction phase</p>	<p>Fences erected do not make use of razor wire</p>
<p>- Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times;</p>	<p>DSS and Contractor</p>	<p>Ensure fenced areas are locked as required through the implementation of a formalised process. Appoint a security company</p>	<p>Construction</p>	<p>cEO</p>	<p>Weekly and as and when required</p>	<p>Fences are locked and no complaints from landowners are received. A security company is appointed</p>
<p>- On completion of the development phase all temporary fences are to be removed;</p>	<p>Contractor</p>	<p>Removal of all temporary fences</p>	<p>Construction</p>	<p>ECO & dEO</p>	<p>Once, following the completion of the construction phase</p>	<p>No temporary fences associated with the project is present following the completion of the construction phase</p>

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<p>- The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.</p>	<p>Contractor</p>	<p>Appropriate removal of all fence uprights</p>	<p>Construction</p>	<p>ECO & dEO</p>	<p>Once, following the completion of the construction phase</p>	<p>No fence uprights associated with the project is present following the completion of the construction</p>
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5.6 Water Supply Management

Impact management outcome: Undertake responsible water usage.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> - All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis; 	DPM & dEO	According to the Water Use Licence	Construction	ECO	Once off prior to construction	Water Use Licence (WUL) on file
<ul style="list-style-type: none"> - The Contractor must ensure the following: <ul style="list-style-type: none"> a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented. 	DPM, Contractor & cEO	Method Statements According to the Water Use Licence	Construction and Operation	ECO	Continuous	Method Statements and Water Use Licence on file and Photographic records
<ul style="list-style-type: none"> - Ensure water conservation is being practiced by: <ul style="list-style-type: none"> a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged. 	Contractor / dEO /cEO in consultation with the ECO	Implement the required water conservation measures throughout on- site construction processes	During the construction phase	ECO	Monthly, and as and when required	Successful implementation of water conservation

5.7 Storm and waste water management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; 	Contractor	Implement measures for the control and management of runoff	Construction	ECO	Continuous	No mismanagement of runoff or contaminated water due to the temporary concrete batching plant
<ul style="list-style-type: none"> All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; 	Contractor and cEO	Obtain approved absorbent material and make use of licensed waste disposal facilities for disposal of oil	Construction	ECO	Continuous	Availability of approved absorbent material at the construction site and proof of disposal of oil at licensed disposal facilities
<ul style="list-style-type: none"> Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; 	DPM in consultation with the ECO	Consultation between the DPM and the ECO to determine if water can be discharged directly into water bodies (where present). The necessary water quality testing must be undertaken prior to discharge	Construction	ECO	As and when the need arises to discharge natural stormwater runoff and clean water	Proof of consultation between the DPM and ECO and the outcomes thereof to be provided. Proof of water quality testing and the results thereof.

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<p>- Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.</p>	<p>DPM in consultation with the ECO</p>	<p>Consultation between the DPM and the ECO to determine if water can be discharged directly into water bodies (where present). The necessary water quality testing must be undertaken prior to discharge</p>	<p>Construction</p>	<p>ECO</p>	<p>As and when the need arises to discharge water</p>	<p>Proof of consultation between the DPM and ECO and the outcomes thereof to be provided. Proof of water quality testing and the results thereof.</p>
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5.8 Solid and hazardous waste management

Impact management outcome: Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- All measures regarding waste management must be undertaken using an integrated waste management approach;	Contractor & cEO	Develop and implement a waste management plan	Construction	ECO	Monthly	Implementation of the waste management plan and proof of waste management through proof of responsible disposal
- Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided;	Contractor & cEO	Provision of appropriate waste collection bins strategically placed throughout the site	Construction	ECO	Continuous	Appropriate waste collection bins are available throughout the site
- A suitably positioned and clearly demarcated waste collection site must be identified and provided	DPM and Contractor in consultation with the cEO	Identify an appropriate location for the waste collection site which must be clearly demarcated through signage and temporary fencing	Construction	ECO	Once, prior to the commencement of construction	A waste collection site is appropriately placed and demarcated
- The waste collection site must be maintained in a clean and orderly manner;	Contractor & cEO	Regular collection of waste and maintenance of the area must be undertaken as per the waste requirements for the project during construction	Construction	ECO	Continuous	The waste collection site is maintained and clean

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- Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal;	Contractor & cEO	Provide separate and marked bins for the different waste types associated with the construction phase	Construction	cEO	Continuous	Separate waste bins are available on site and waste generated is separated into the relevant bins
- Staff must be trained in waste segregation;	cEO / dEO in consultation with the ECO	Include waste segregation as part of the environmental awareness training material.	Construction	ECO	Monthly, and as and when required	Environmental awareness training material requirements checklist
- Bins must be emptied regularly;	Contractor & cEO	Bins must be emptied before reaching total capacity and on a regular basis as required for the project	Construction	ECO	Monthly	No mismanagement of bins.
- General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company;	Contractor & cEO	Disposal of general waste at licensed waste disposal facilities must be undertaken as per the waste management plan	Construction	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided
- Hazardous waste must be disposed of at a registered waste disposal site;	Contractor & cEO	Disposal of hazardous waste at licensed waste disposal facilities must be undertaken as per the waste management plan	Construction	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided

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- Certificates of safe disposal for general, hazardous and recycled waste must be maintained.	Contractor & cEO	Obtain certificates for safe disposal of waste	Construction	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided and filed as part of the filing system
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5.9 Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities;	Contractor	Contractor to undertake activities which can cause spills of pollutants outside of watercourses	Construction	ECO	Continuous	No incidents reported of spillage of pollutants into watercourses
– In the event of a spill, prompt action must be taken to clear the polluted or affected areas;	Contractor and cEO	Develop a management plan or process for implementation should a spill take place	Construction	ECO	Continuous	Feedback must be provided by the contractor in terms of how the spill was handled and photographic evidence of the feedback must be provided and kept on record
– Where possible, no development equipment must traverse any seasonal or permanent wetland	Contractor and cEO	Develop a Method statement on how to traverse any seasonal or permanent wetland	Construction	ECO	Continuous	Feedback must be provided by the contractor in terms of how the spill was handled and photographic evidence of the feedback must be provided and kept on record

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<p>– No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone should occur;</p>	N/A					
<p>– Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available;</p>	cEO, Contractor	Ensure that permeant crossings (access roads) are provided for access to the grid connection corridor if no alternative crossing is available.	Construction	ECO	Continuous	Ensure that permeant crossings are developed if there is no alternative.
<p>– There must not be any impact on the long term morphological dynamics of watercourses or estuaries;</p>	DPM, cEO	Develop a management plan or process for implementation should a spill take place within a watercourse and ensure continually monitoring	Construction	ECO, dEO	For all phases of the project life cycle (i.e. construction, operation, decommissioning)	No incidents reported of spillage of pollutants into watercourses
<p>– Existing crossing points must be favored over the creation of new crossings (including temporary access)</p>	DPM, cEO & Contractor	Develop a management plan or process for implementation should a spill take place within a watercourse and ensure continually monitoring	Pre- construction and construction	ECO, dEO	During the construction phase of the project.	Existing crossing points utilised as opposed to new ones created and no incidents reported of spillage of pollutants into watercourses
<p>– When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse</p>	Contractor & cEO	Activities undertaken near watercourses must be in-line with and consider the specified	Pre- construction and construction	ECO	Monthly, and as and when required	No degradation of the watercourses and no incidents of

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<p>b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained;</p> <p>c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and</p> <p>d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.</p>		<p>environmental controls</p>				<p>destruction reported</p>
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5.10 Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General: – Indigenous vegetation which does not interfere with the development must be left undisturbed;	cEO and Contractor	Demarcate areas of indigenous vegetation to be avoided before clearance is undertaken	Construction and operation (i.e. for maintenance purposes)	ECO Operation and maintenance team	Weekly, and as and when required	No unnecessary clearance of indigenous vegetation to be undertaken
– Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species;	Contractor & cEO	Demarcate areas containing protected or endangered species to be avoided by construction activities	Construction	ECO	Weekly, and as and when required	No clearance of protected or endangered species other than those permitted to be removed
– Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing;	Relevant specialist in consultation with the Contractor and the cEO	Develop and implement a Plant Search and Rescue Plan (if required)	Pre-construction & Construction	ECO	Weekly, and as and when required	Implementation of the Plant Search and Rescue Plan and photographic evidence and notes of the implementation of the plan
– Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed;	DPM & dEO	Undertake the permitting process in order to obtain the relevant permits for the removal of protected species. Permits kept on file	Pre-construction	ECO	Once, prior to the commencement of the construction phase and removal of the protected	Permits on file

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					species	
- The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals;	ECO	Ensure that the audit report indicates all species rescued and replanted and provides feedback in terms of compliance with the conditions of permits for replanting	Construction	ECO	N/A	
- Trees felled due to construction must be documented and form part of the Environmental Audit Report;	ECO	Ensure that the audit report documents the details of trees felled	Construction	ECO	N/A	
- Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;	Contractor & cEO	Felled trees, vegetation cuttings and debris must be disposed of at a licensed waste disposal facility	Construction	ECO	Monthly	No felled trees, vegetation cuttings and debris are dumped in inappropriate locations and disposal certificates are available as proof of responsible disposal
- Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained;	DPM and Contractor	A suitably qualified pest control operator must be appointed	Construction and Operation	ECO	As and when the use of herbicides is required	Only registered pest control operators must be appointed and proof of their

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						registration must be provided
- A daily register must be kept of all relevant details of herbicide usage;	Contractor & cEO	Develop a daily register for the documentation of the details of herbicide usage	Construction	ECO	Monthly	Daily register provided by the pest control operator
- No herbicides must be used in estuaries;	N/A					
- All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to Section 5.3: Access restricted areas . Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.	Contractor in consultation with the cEO	Spatially demarcate protected species and sensitive vegetation and implement appropriate fencing where required as per section 5.3	Construction	ECO	Continuous	Demarcation and fencing is undertaken in-line with the requirements of section 5.3

5.11 Protection of fauna

Impact management outcome: Disturbance to fauna is minimised.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present;	dEO / cEO Contractor	Develop a procedure for dealing with livestock within the affected properties	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and as and when required during the construction phase	Written consent provided by the landowner and proof of representation of the landowner during interference
- The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme;	dEO / cEO in consultation with the Contractor	Breeding sites for wild bird species must be taken into consideration	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and as and when required	Photographic record of intact breeding sites Layout to be adhered to.
- Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present;	dEO / cEO in consultation with the Contractor	Avoid breeding sites and ensure that special care is taken in the presence of nestlings and fledglings	Construction and Operation	ECO Operation and maintenance team	Weekly, and as an when required during the construction. Monthly, and as and when required during operation	Photographic record of intact breeding sites
- Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds;	dEO / cEO in consultation with the	All mitigation measures recommended by	Construction and Operation	ECO Operation and	Weekly during constructio	Photographic record of compliance

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	Contractor	the avifauna specialist must be implemented		maintenance team	n and monthly during operation	and successful implementation of the recommended measures
- No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas;	dEO / cEO in consultation with the Contractor	All site staff must be informed of this requirement during the Environmental Awareness Training and the consequences of not adhering to the requirement. These areas must be demarcated as Access Restricted Areas	Construction	ECO	Monthly, and as and when required	
- No deliberate or intentional killing of fauna is allowed;	dEO / cEO in consultation with the Contractor	Implement and maintain snake deterrents on pylons in areas where snakes are abundant	Construction and Operation	ECO Operation and maintenance team	During the construction and when required. Monthly during operation	Photographic record of the implementation and maintenance of snake deterrents
- In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and	N/A					
- No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits.	DPM in consultation with the dEO	Undertake a permitting process to obtain the required permits	Pre-construction	ECO	Once, prior to the commencement of construction and as and when required	Permits for removal and/relocation must be kept on file

5.12 Protection of heritage resources

Impact management outcome: Impact to heritage resources is minimised.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in Section 5.3: Access restricted areas; 	DPM and a suitably qualified specialist dEO / cEO in consultation with the Contractor and ECO	Undertake a Heritage Walk-through Survey Spatially identify and demarcate areas of heritage significance as per the Heritage Impact Assessment and as per the requirements of section 5.3	Pre-construction	ECO	Once, prior to the commencement of construction	Proof of avoidance of sensitive heritage features through details of avoidance and photographic records
<ul style="list-style-type: none"> Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; 	Suitably qualified specialist in consultation with the ECO	Appoint a suitably qualified specialist to carry out the monitoring of excavations for fossils, artefacts and important heritage material	Construction	ECO	During the undertaking of excavations of fossils, artefacts and heritage material	Proof of appointment of a suitably qualified specialist and photographic record of required monitoring by the specialist
<ul style="list-style-type: none"> All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences. 	dEO / cEO in consultation with the Contractor and ECO	Develop and implement procedures for situations where human remains, archaeological, palaeontological or historical material are uncovered	Construction	ECO	Weekly, during the construction phase and as and when required	Proof of work ceased and the required procedures followed in cases where material is discovered.

5.13 Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
<ul style="list-style-type: none"> Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; 	cEO in consultation with the Contractor	Develop an Emergency Preparedness, Response and Fire Management Plan specific to the project	Pre-construction Construction	ECO	Once, prior to the commencement of construction and weekly during the construction phase	Compliance with the Emergency Preparedness, Response and Fire Management Plan
<ul style="list-style-type: none"> All unattended open excavations must be adequately fenced or demarcated; 	Contractor & cEO	Ensure that all excavations undertaken is fenced and demarcated within a reasonable timeframe and in instances where excavations will be open for long-periods of time	Construction	ECO	Weekly	Excavations are fenced where required and photographic proof can be provided
<ul style="list-style-type: none"> Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; 	Contractor	All staff must be easily identifiable and the climbing of towers and scaffolding must be undertaken by authorized personnel as managed by the Contractor	Construction	ECO	Monthly, and as and when required	No incidents of unauthorised climbing is reported
<ul style="list-style-type: none"> Ensure structures vulnerable to high winds are secured; 	Contractor	Ensure that sufficient stabilisation measures are implemented to secure structures	Construction	ECO	Weekly, and as and when required	No incidents of unstable structures due to high

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		vulnerable to high winds				winds is reported
- Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.	cEO	Compile and regularly update as incidents and complaints are submitted from the public and indicate the actions taken to resolve the complaint	Construction	ECO	Monthly, and as and when required	The incidents and complaints register is complete and provides all the required details

5.14 Sanitation

Impact management outcome: Clean and well maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Mobile chemical toilets are installed onsite if no other ablution facilities are available;	Contractor & cEO	Mobile chemical toilets must be placed appropriately and in areas that avoid environmental sensitivities	Construction	ECO	Weekly	Mobile toilets are installed and avoid environmental sensitivities
– The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances;	Contractor in consultation with the cEO	All site staff must be informed of this requirement during the Environmental Awareness Training and the consequences of not adhering to the requirement.	Pe-construction & Construction	ECO	Monthly, and as and when required	No evidence of non-compliance identified
– Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards;	Contractor in consultation with the cEO	The installation of the toilets by the Contractor must be as per the listed requirements	Construction	ECO	Weekly	No evidence of non-compliance identified

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<ul style="list-style-type: none"> - A copy of the waste disposal certificates must be maintained. 	Contractor & cEO	Certificates obtained from the licensed waste disposal facility with the emptying of the toilets must be kept on file	Construction	ECO	Monthly, and as and when required	Certificates for waste disposal from the licensed waste disposal facility
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5.15 Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Undertake environmentally-friendly pest control in the camp area;	Contractor & cEO	Only environmentally-friendly pest control must be used, when required	Construction	ECO	As and when pest control is required for the project	Contractor to provide proof of pest control used being environmentally-friendly
– Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV/AIDS;	cEO / Contractor in consultation with the ECO	The effects of sexually transmitted diseases and HIV/AIDS must be covered in the Environmental Awareness Training	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during construction	Environmental awareness training material requirements checklist
– The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area;	Contractor & cEO	Develop and place information posters on HIV/AIDS	Construction	ECO	Weekly	Photographic evidence of poster placement
– Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;	cEO / Contractor in consultation with the ECO	Information and education of sexually transmitted diseases must be covered in the Environmental Awareness Training.	Pre-construction & Construction	ECO	Monthly	Environmental awareness training material requirements checklist
– Free condoms must be made available to all staff on site at central points;	Contractor	Placement of free condoms in mobile toilets and at the construction camps	During the Construction Phase		Monthly	Proof of placement of free condoms by the contractor to

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<p>- Medical support must be made available;</p>	<p>dEO / cEO in consultation with the Contractor</p>	<p>Ensure that designated personnel with first aid training are available on site and that first aid kits to provide medical support is readily available</p>	<p>Construction and Operations</p>	<p>ECO</p>	<p>Monthly</p>	<p>be provided Check the availability of first aid trained personnel and medical kits (including if these are complete in terms of supplies)</p>
<p>- Provide access to Voluntary HIV Testing and Counselling Services.</p>	<p>Contractor</p>	<p>Compile a HIV testing schedule and provide counselling services where required</p>	<p>Construction</p>	<p>ECO</p>	<p>Quarterly, and as and when required</p>	<p>Voluntary testing schedules and proof of counselling (where undertaken)</p>

5.16 Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project;	Contractor in consultation with the cEO	Develop an Emergency Preparedness, Response and Fire Management Plan specific to the project	Pre-construction	ECO	Once, prior to the commencement of construction	Emergency Preparedness, Response and Fire Management Plan compiled
– The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;	Contractor & cEO	Develop an Emergency Preparedness, Response and Fire Management Plan specific to the project which covers accidents, potential spillages and fires	Pre-construction	ECO	Once, prior to the commencement of construction	Emergency Preparedness, Response and Fire Management Plan includes required specifications
– All staff must be made aware of emergency procedures as part of environmental awareness training;	cEO / dEO in consultation with the ECO	Develop environmental awareness training material which covers the relevant emergency procedures	Pre-construction	ECO	Prior to the commencement of the environmental awareness training	Environmental awareness training material requirements checklist
– The relevant local authority must be made aware of a fire as soon as it starts;	Contractor in consultation with the DPM, dEO & ECO	Develop and include a procedure in the Emergency Preparedness, Response and Fire Management Plan	Construction	ECO	As and when a fire occurs	The local authority was informed as per the relevant procedure set out in the

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		for the event of a fire and the procedure to be followed for informing the local authority				Emergency Preparedness, Response and Fire Management Plan
- In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see Hazardous Substances section 5.17).	Contractor & CEO	Implement the required mitigation measures in the event of a spill or leak as per the requirements of Section 5.17.	Construction and Operations	ECO	As and when a spill or leak occurs	The mitigation measures included under Section 5.17 have been adhered to

5.17 Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible;	cEO in consultation with the Contractor	Develop a strategy of how hazardous substances can be and should be minimised	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Contractor to provide evidence of substances used for proof of compliance
- All hazardous substances must be stored in suitable containers as defined in the Method Statement;	Contractor & cEO	Develop a Method Statement for the storage of hazardous substances in suitable containers	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Photographic proof that hazardous substances are stored in suitable containers as per the requirements of the relevant Method Statements
- Containers must be clearly marked to indicate contents, quantities and safety requirements;	Contractor & cEO	Develop a Method Statement for the storage of hazardous substances in suitable containers	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Photographic proof that hazardous substances are stored in suitable containers as per the requirements of the relevant Method

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- All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;	Contractor	Where hazardous waste is stored these must be clearly marked indicating the material and capacity.	During the Construction Phase	ECO	Monthly	Photographic proof that containers are marked as per the requirements
- Bunded areas to be suitably lined with a SABS approved liner;	Contractor	Where hazardous waste is stored these must be clearly marked indicating the material and capacity.	Construction	ECO	Monthly	Photographic proof that containers are marked as per the requirements
- An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;	cEO / Contractor	Compile and update an Alphabetical Hazardous Chemical Substance (HCS) control sheet specific to the project	Construction	ECO	Monthly, and as and when required	Complete and up to date control sheet provided by the Contractor
- All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);	cEO / Contractor	Keep a record of all hazardous chemicals and the respective MSDS	Construction	ECO	Monthly, and as and when required	Record of hazardous chemicals and the respective MSDS
- All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;	cEO / Contractor	Provide training for personnel working with HCS	Pre-construction	ECO	Once, prior to the commencement of construction and as and when required	Record of training provided to personnel working with HCS
- Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be	cEO / Contractor	Develop environmental awareness training	Pre-construction & Construction	ECO	Prior to the commencement of the	Environmental awareness training

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made available;		material which covers the relevant impacts and safety measures. Provide appropriate training and personal protective equipment for the relevant personnel handling hazardous substances and materials			environmental awareness training and monthly during the construction phase for personal protective equipment	material requirements checklist and all relevant personnel have undergone appropriate training and have access to personal protective equipment
- The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;	Contractor & cEO	Appropriate storage facilities must be constructed or obtained for the storing of diesel, other liquid fuel, oil and hydraulic fluid	Construction	ECO	Monthly, and as and when required	Storage tanks for the project are appropriate and no incidents are reported in this regard
- The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall);	Contractor & cEO	Appropriate storage facilities must be constructed or obtained for tanks as per the requirements listed	Construction	ECO	Monthly, and as and when required	Storage areas for the tanks/ bowsers for the project are appropriate and no incidents are reported in this regard
- The floor of the bund must be sloped, draining to an oil separator;	Contractor & cEO	Appropriate storage facilities	Construction	ECO	Once, during	Bunded storage areas

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		must be constructed as per the requirements listed			construction	are constructed according to the requirements
- Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;	Contractor & cEO	Appropriately constructed refueling facility must be developed as per the requirements. Drip trays must be provided for use	Construction	ECO	Continuous	Soils at the refueling facility are protected as required and drip trays are provided and used
- All empty externally dirty drums must be stored on a drip tray or within a bunded area;	Contractor & cEO	Ensure that empty dirty drums are stored appropriately according to a waste method statement	Construction	ECO	Continuous	Drip trays or bunded areas are used for the storage of dirty drums. Waste Method Statement on file
- No unauthorised access into the hazardous substances storage areas must be permitted;	Contractor & cEO	Ensure through the implementation of procedures that no unauthorised access is undertaken into the storage areas	Construction	ECO	Monthly	Proof of the implementation of the relevant procedure must be provided by the Contractor
- No smoking must be allowed within the vicinity of the hazardous storage areas;	Contractor & cEO	Inform all employees of the requirement and develop and place relevant signage in the relevant areas	Construction	ECO / cEO	Monthly / Weekly	Photographic record of the signage placed must be provided
- Adequate fire-fighting equipment must be made available at all hazardous storage areas;	Contractor & cEO	Hazardous storage areas must be fitted with adequate fire-	Construction	ECO	Monthly	Adequate fire-fighting equipment is available and

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		fighting equipment				has been serviced
- Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used;	Contractor & cEO	Provide a mobile refueling unit as well as suitable ground protection, where required	Construction	ECO	Monthly, and as and when required	A mobile refueling unit and suitable ground protection is available for use
- An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times;	Contractor & cEO	Provide an appropriate spill kit for the use of hazardous substances	Construction	ECO	Monthly, and as and when required	Appropriate spill kits are available for use
- The responsible operator must have the required training to make use of the spill kit in emergency situations;	cEO and Contractor	Provide training on the use of spill kits to the relevant employees	Pre-construction	ECO	Once, prior to the commencement of construction	Proof of training to be provided by the contractor
- An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken;	cEO and Contractor	Provide an appropriate number of spill kits in relevant areas	Construction	ECO	Monthly	Proof of appropriate number of spill kits in appropriate areas to be provided by the contractor
- In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to Section 5.7 for procedures concerning storm and waste water management and 5.8 for solid and hazardous waste management .	cEO and Contractor	Storage and disposal of contaminated soil must be in accordance with the National Environmental Management: Waste Act and sections 5.7 and 5.8 of this EMPr	Construction	ECO	Monthly, and as and when required	Proof of storage and disposal in terms of the National Environmental Management: Waste Act must be provided. Certificates of

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							disposal at licensed waste disposal facilities must be provided
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5.18 Workshop, equipment maintenance and storage

Impact management outcome: Soil, surface water and groundwater contamination is minimised.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area;	Contractor	Demarcate specific areas for the maintenance of vehicles and equipment	Construction	ECO	Monthly	A dedicated area for the maintenance of vehicles and machinery is used.
- During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts;	Contractor & cEO	Ensure that a drip tray is available for an emergency repairs required	Construction	ECO	Monthly	Contractor to provide evidence of drip tray use for emergency repairs
- Leaking equipment must be repaired immediately or be removed from site to facilitate repair;	Contractor & cEO	Ensure that where leaking equipment is identified it is repaired immediately or removed from site for repairs	Construction	ECO	Monthly	Contractor to provide details of equipment repaired or removed from site
- Workshop areas must be monitored for oil and fuel spills;	cEO	Undertake regular inspections of the workshop areas for oil and fuel spills and keep an updated register of inspection on site	Construction	ECO	Monthly	Register of inspection
- Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;	Contractor & cEO	Provide an appropriate spill kit for the project	Construction	ECO	Monthly, and as and when required	Appropriate spill kits are available for use
- The workshop area must have a bunded concrete slab that is	Contractor &	Ensure that the	Construction	ECO	Once,	Workshop

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sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed;	cEO	workshop area is sufficiently bunded in accordance with the required specification			during the Construction Phase and as and when required	area is bunded in accordance with the required specification
– Water drainage from the workshop must be contained and managed in accordance Section 5.7: Storm and wastewater management .	Contractor & cEO	Ensure that water drainage from workshop area is managed as per the requirements of section 5.7	Construction	ECO	Monthly	Workshop drainage is managed in accordance with the requirements

5.19 Batching plants

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Concrete mixing must be carried out on an impermeable surface;	Contractor	Provide impermeable surface for the mixing of concrete	Construction	ECO	Weekly	No concrete mixing is undertaken on open ground
- Batching plants areas must be fitted with a containment facility for the collection of cement laden water.	N/A					
- Dirty water from the batching plant must be contained to prevent soil and groundwater contamination	N/A					
- Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains;	Contractor	Demarcate and provide a storage area for bagged cement in-line with the listed requirements	Construction	ECO	Weekly	Photographic proof of bagged cement stored within the demarcated area
- A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;	Contractor	Provide a washout facility for the washing of associated equipment. Enforce limitations on water use for washing of equipment	Construction	ECO	Weekly	No cement laden water is released into the environment. Only minimal water is used for washing
- Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility;	Contractor	Make use of hardened concrete where possible or dispose of concrete in a suitable manner	Construction	ECO	Monthly	Certificates of disposal of concrete at licensed waste disposal facility
- Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;	Contractor	Bind empty cement bags and	Construction	ECO	Monthly	Proof of binding of

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		temporarily store it in an appropriate area on site				empty cement bags and storage in an appropriate area on site to be provided by the Contractor
- Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to Section 5.20: Dust emissions)	Contractor	Ensure that sand and aggregates are kept damp or otherwise protected from dust generation	Construction	ECO	Monthly	Proof of damping (or alternative dust suppression) of sand and aggregates must be provided by the Contractor
- Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility;	Contractor	Ensure that all excess sand, stone and cement is removed or reused	Construction	ECO	Once, with the completion of construction	Certificates for the disposal of sand, stone and cement at licensed waste disposal facilities or proof of reuse must be provided
- Temporary fencing must be erected around batching plants in accordance with Section 5.5: Fencing and gate installation .	N/A					

5.20 Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO;	Contractor	Apply dust suppressant	Construction	ECO	Weekly	Contractor to provide proof of use of dust suppressants, Dust Management Method Statement
– Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible;	Contractor	Proper planning for vegetation removal must be undertaken as well as for the associated rehabilitation	Construction and Rehabilitation	ECO	Weekly	Plan for implementation must be provided by the Contractor
– Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;	Contractor	Ensure that specific limitations are placed on the transport and handling of erodible materials during high wind conditions or when a visible dust plume is present	Construction	ECO	Bi-weekly	No complaints submitted in this regard
– During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level;	ECO	ECO to provide adequate recommendation	Construction	N/A		
– Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind;	Contractor	Place soil stockpiles in areas less affected by	Construction	ECO	Bi-weekly	Soil stockpiles are not exposed to

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		wind				wind and have not been eroded
- Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;	Contractor in consultation with the ECO	Contractor to implement erosion control measures as recommended and agreed with the ECO	Construction	ECO	Weekly, until erosion is no longer a problem	Recommendations made by the ECO have been implemented by the Contractor
- Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas;	cEO / dEO / contractor	Inform all drivers of speed limits and place appropriate signage along the relevant roads	Construction	ECO Operation and Maintenance team	Monthly	No complaints from community members are submitted
- Straw stabilisation must be applied at a rate of one bale/10 m ² and harrowed into the top 100 mm of top material, for all completed earthworks;	Contractor	Ensure that straw stabilisation is undertaken as per the listed requirements	Construction	ECO	Monthly	Photographic record of all straw stabilisation undertaken
- For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.	Contractor & cEO	Appropriate dust suppressant measures are implemented	Construction	ECO	Weekly	Photographic record of measures being implemented and the results thereof

5.21 Blasting

Impact management outcome: Impact to the environment is minimised through a safe blasting practice.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Any blasting activity must be conducted by a suitably licensed blasting contractor; and	Proponent	Proponent to appoint licenced blasting contractor	Prior to commencement of construction (if required)	ECO	Once-off	Contract documentation
- Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.	Contractor	Appropriate notification methods	24 hours prior to blasting activities	ECO	Monthly	Proof of notification

5.22 Noise

Impact Management outcome: Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only;	Contractor	Ensure that noise limits do not exceed acceptable limits and avoid the use of amplification communication	Construction	ECO	Monthly, and as and when required	No complaints registered in this regard. No amplification equipment is used.
– All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained;	Contractor & cEO	Provide and implement silencing technology	Construction	ECO	Monthly, and as and when required	No complaints registered in this regard. Silencing technology is utilised.
– Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers;	cEO	Update complaints register. Provide daily transport to and from site for employees	Construction	ECO	Monthly, and as and when required	Complaints register provided by the cEO and proof of transportation services provided
– Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management.	cEO and Contractor in consultation with the ECO	Compile a Code of Conduct for staff. Appropriate operating hours must be identified for the project.	Pre-construction and Construction	ECO	Once, prior to the commencement of construction	No complaints registered in this regard.

5.23 Fire prevention

Impact management outcome: Prevention of uncontrollable fires.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Designate smoking areas where the fire hazard could be regarded as insignificant;	cEO / Contractor	Identify and demarcate through signage designated smoking areas	Pre-construction & Construction	ECO	Monthly	Photographic record of designated smoking area
– Firefighting equipment must be available on all vehicles located on site;	cEO / dEO in consultation with the Contractor	Provide all vehicles with firefighting equipment	Construction	ECO	Monthly	All vehicles are fitted with firefighting equipment and the details thereof are provided by the cEO
– The local Fire Protection Agency (FPA) must be informed of construction activities;	DPM, Contractor in consultation with the cEO	Undertake formal consultation to inform the local FPA of the associated construction activities	Pre-construction	ECO	Once, during the commencement of the Construction Phase	Proof of consultation with the FPA
– Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;	dEO / cEO / Contractor in consultation with the ECO	Develop environmental awareness training material which covers the contact numbers for the FPA and emergency services. Place the contact numbers for the FPA and emergency services at a visible and central	Pre-construction & Construction	ECO	Prior to the commencement of the environmental awareness training and once during the construction phase	Environmental awareness training material requirements checklist and photographic record of contact numbers on display

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		location			
- Two way swop of contact details between ECO and FPA.	ECO	Consultation between the ECO and FPA in order to exchange contact details	Pre-construction	N/A	

5.24 Stockpiling and stockpile areas

Impact management outcome: Reduce erosion and sedimentation as a result of stockpiling.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies;	Contractor & cEO	Identify and demarcate an appropriate location for the storage of excavated materials	Pre-construction & Construction	ECO	Monthly	Excavated material is not stored within sensitive environmental areas
– All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods;	Contractor & cEO	Implement appropriate and sufficient maintenance on stockpiled material regularly	Construction	ECO	Bi-weekly (every second month)	Stockpiled material is maintained sufficiently and is clear of weeds and alien vegetation
– Topsoil stockpiles must not exceed 2 m in height;	Contractor & cEO	Enforce limitations for the height of topsoil stockpiles	Construction	ECO	Bi-weekly (every second month)	Topsoil stockpiles do not exceed 2m in height
– During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.);	Contractor & cEO	Appropriate material must be provided in order to cover stockpiles when required	Construction	ECO	Monthly	Contractor to provide proof of availability of appropriate material to cover stockpiles when required
– Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.	Contractor & cEO	Sandbags must be provided in order to prevent erosion of stockpiled materials	Construction	ECO	Monthly	Contractor to provide proof of availability of sandbags to prevent erosion of

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						stockpiled materials
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5.25 Civil works

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone;	Contractor	Collect and retain topsoil for terracing	Construction Rehabilitation	ECO	Weekly	Proof of collection and retaining of topsoil
- Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards;	Contractor	Undertake rehabilitation of terrace embankments and areas outside of the high voltage yard where applicable	Construction Rehabilitation	ECO	Weekly	Photographic record of rehabilitation of terrace embankments and areas outside the high voltage yards
- Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;	Contractor	All disturbed slope areas must be stabilised	Construction Rehabilitation	ECO	Weekly	Disturbed slopes are stabilised sufficiently
- These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly;	Contractor	Stabilise slopes as per the design specifications	Construction Rehabilitation	ECO	Weekly	Slopes are stabilised as per the design specifications
- Rehabilitation of the disturbed areas must be managed in accordance with Section 5.35: Landscaping and rehabilitation ;	Contractor & cEO	Undertaken rehabilitation of disturbed areas as per the requirements listed under section 5.35	Construction Rehabilitation	ECO	Weekly	Rehabilitation of disturbed areas is undertaken in-line with the requirements of section 5.35
- All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and	Contractor & cEO	Use a licensed waste disposal facility for the disposal of excess spoil	Construction	ECO	Weekly	Certificates obtained for the disposal of excess spoil at a licensed

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						waste disposal facility
- Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes.	Contractor	Spoil used for landscaping must be applied as per the listed requirements	Construction Rehabilitation	ECO	Weekly	Photographic record of spoil used for landscaping

5.26 Excavation of foundation, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs as a result of excavation of foundation, cable trenching and drainage systems.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a licensed landfill site, if not used for backfilling purposes;	Contractor & cEO	Use a licensed waste disposal facility for the disposal of excess spoil	Construction Rehabilitation	ECO	Monthly	Certificates obtained for the disposal of excess spoil at a licensed waste disposal facility
– Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;	Contractor	Spoil used for landscaping must be applied as per the listed requirements	Construction Rehabilitation	ECO	Monthly	Photographic record of spoil used for landscaping purposes
– Management of equipment for excavation purposes must be undertaken in accordance with Section 5.18: Workshop, equipment maintenance and storage ; and	Contractor & cEO	Undertake the management of equipment for excavation as per the requirements of section 5.18	Construction Rehabilitation	ECO	Monthly	Management of equipment is undertaken in line with the requirements of section 5.18
– Hazardous substances spills from equipment must be managed in accordance with Section 5.17: Hazardous substances .	Contractor & cEO	Undertake the management of hazardous substances spills from equipment as per the requirements of section 5.17	Construction Rehabilitation	ECO	Monthly	Management of hazardous substances spills from equipment is undertaken in line with the requirements of section 5.17

5.27 Installation of foundations, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs during the installation of foundation, cable trenching and drainage system.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Batching of cement to be undertaken in accordance with Section 5.19: Batching plants ; and	Contractor	Undertake the batching of cement as per the requirements of section 5.19	Construction Rehabilitation	ECO	Monthly	Management of batching cement is undertaken in line with the requirements of section 5.19
- Residual solid waste must be disposed of in accordance with Section 5.8: Solid waste and hazardous management .	Contractor	Undertake the disposal of solid waste as per the requirements of section 5.8	Construction Rehabilitation	ECO	Monthly	The disposal of solid waste is undertaken in line with section 5.8

5.28 Installation of equipment (circuit breakers, current Transformers, Isolators, Insulators, surge arresters, voltage transformers, earth switches)

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Management of dust must be conducted in accordance with Section 5.20: Dust emissions ;	Contractor & cEO	Manage dust as per the requirements of section 5.20	Construction Rehabilitation	ECO	Monthly	The management of dust is undertaken as per the requirements of section 5.20
- Management of equipment used for installation must be conducted in accordance with Section 5.18: Workshop, equipment maintenance and storage ;	Contractor & cEO	Undertake the management of equipment for installation as per the requirements of section 5.18	Construction Rehabilitation	ECO	Monthly	Management of hazardous substances and associated spills is undertaken in line with the requirements of section 5.17
- Management hazardous substances and any associated spills must be conducted in accordance with Section 5.17: Hazardous substances ; and	Contractor & cEO	Undertake the management of hazardous substances and associated spills as per the requirements of section 5.17	Construction Rehabilitation	ECO	Monthly	Management of hazardous substances and associated spills is undertaken in line with the requirements of section

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- Residual solid waste must be recycled or disposed of in accordance with Section 5.8: Solid waste and hazardous management.	Contractor & cEO	Undertake the recycling or disposal of residual solid waste as per the requirements of section 5.8	Construction Rehabilitation	ECO	Monthly	5.17 The recycling or disposal of residual solid waste is undertaken in line with section 5.8.
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5.29 Steelwork Assembly and Erection

Impact management outcome: No environmental degradation occurs as a result of steelwork assembly and erection.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- During assembly, care must be taken to ensure that no wasted/unused materials are left on site e.g. bolts and nuts	Contractor & cEO	Inspect areas where construction is being undertaken and remove and appropriately dispose of wasted/unused materials	Construction Rehabilitation	ECO	Weekly	Contractor to provide proof of inspection and removal of waste/unused materials and the appropriate disposal thereof (i.e., disposal certificates)
- Emergency repairs due to breakages of equipment must be managed in accordance with Section 5.18: Workshop, equipment maintenance and storage and Section 5.16: Emergency procedures .	Contractor	Undertake emergency repairs of equipment as per the requirements of section 5.18 and 5.16	Construction Rehabilitation	ECO	Weekly	Emergency repairs of equipment is undertaken as per the requirements of section 5.18 and 5.16

5.30 Cabling and Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with Section 6.8: Solid waste and hazardous Management;	Contractor & cEO	Undertake the recycling or disposal of residual solid waste as per the requirements of section 5.8	Construction	ECO	Monthly	The recycling or disposal of residual solid waste is undertaken in line with section 5.8.
- Management of equipment used for installation shall be conducted in accordance with Section 5.18: Workshop, equipment maintenance and storage;	Contractor & cEO	Undertake the management of equipment for installation as per the requirements of section 5.18	Construction	ECO	Monthly	Management of equipment for installation is undertaken in line with the requirements of section 5.18
- Management hazardous substances and any associated spills shall be conducted in accordance with Section 5.17: Hazardous substances.	Contractor & cEO	Undertake the management of hazardous substances and associated spills as per the requirements of section 5.17	Construction	ECO	Monthly	Management of hazardous substances and associated spills is undertaken in line with the requirements of section 5.17

5.31 Testing and Commissioning (all equipment testing, earthing system, system integration)

Impact management outcome: No environmental degradation occurs as a result of Testing and Commissioning.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Residual solid waste must be recycled or disposed of in accordance with Section 5.8: Solid waste and hazardous management.	Contractor & cEO	Undertake the recycling or disposal of residual solid waste as per the requirements of section 5.8	Construction	ECO	Monthly	the recycling or disposal of residual solid waste is undertaken in line with section 5.8

5.32 Socio-economic

Impact management outcome: enhanced socio-economic development.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Develop and implement communication strategies to facilitate public participation;	dEO / cEO in consultation with Contractor and DPM	Identify and implement appropriate strategies for communication with the communities through consideration of the community needs	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction	Communication is undertaken as per the identified strategies and no complaints are submitted regarding communication
- Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;	Contractor & cEO	Development and implement a Grievance Mechanism which considers the community needs and provides procedures for conflict resolution	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Conflict resolution is undertaken in line with the requirements of the Grievance Mechanism. No complaints on conflict resolution are submitted by the community
- Sustain continuous communication and liaison with neighboring owners and residents	Contractor & cEO	Development and implement and Grievance Mechanism	Pre-construction & Construction	ECO	Once, prior to the commencement of	Communication / liaison with neighbouring

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		provides procedures for communication / liaison with neighbouring landowners and residents			construction and monthly during the construction phase	landowners and residents are undertaken in line with the requirements of the Grievance procedure. No complaints on communication with neighbouring landowners and residents is submitted
- Create work and training opportunities for local stakeholders; and	Contractor	Develop and implement a "locals first" policy for the provision of employment opportunities	Pre-construction & Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Locals to be considered in terms of the employment and training opportunities where applicable
- Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers.	Contractor & cEO	Only permitted personal are allowed onsite during construction and operation.	Pre-construction, Construction and Operation	ECO	Once, prior to the commencement of construction and during the operation phase	Accommodation Register to be implemented

5.33 Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage;	Contractor & cEO	Regular emptying of the bunds must be undertaken. This must be undertaken as per the requirements listed in sections 5.17 and 5.18	Construction	ECO	Prior to site closure for more than 5 days	Bunds are emptied as per the requirements listed under sections 5.17 and 5.18
– Hazardous storage areas must be well ventilated;	Contractor & cEO	Install appropriate ventilation in all hazardous storage areas	Construction	ECO	Prior to site closure for more than 5 days	Effective ventilation is installed in hazardous storage areas
– Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;	Contractor & cEO	Ensure fire extinguishers are serviced, as required and are easily accessible with appropriate signage indicating location. Ensure service records and kept up to date and filed	Construction	ECO	Prior to site closure for more than 5 days	Signage placed indicating location of fire extinguishers and service records
– Emergency and contact details displayed must be displayed;	Contractor & cEO	Place emergency and contact details which are readily available and easily accessible	Construction	ECO	Prior to site closure for more than 5 days	Photographic proof of contact details on display
– Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;	Contractor in consultation with the ECO	Hold a workshop with all security personnel to	Construction	ECO	Prior to site closure for more than	Proof of the workshop held must be

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		provide a brief of the project and security requirements. Provide facilities in order to contact management and emergency personnel			5 days	kept on file by the contractor.
- Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;	Contractor	Regular checks of night hazards must be undertaken	Construction	ECO	Prior to site closure for more than 5 days	Proof of checks of night hazards must be provided by the contractor
- Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;	cEO / Contractor in consultation with the DPM / dEO	Identify any potential fire hazards and notify the relevant local authority	Construction	ECO	Prior to site closure for more than 5 days	Proof of notification of the fire hazards to the local authority must be provided by the Contractor / cEO
- Structures vulnerable to high winds must be secured;	Contractor	Ensure structures vulnerable to wind are secure prior to site closure	Construction	ECO	Prior to site closure for more than 5 days	Structures vulnerable to wind are secured prior to site closure
- Wind and dust mitigation must be implemented;	Contractor & cEO	Implement wind and dust mitigation prior to site closure	Construction	ECO	Prior to site closure for more than 5 days	Wind and dust mitigation is implemented prior to site closure
- Cement and materials stores must have been secured;	Contractor &	Ensure cement	Construction	ECO	Prior to site	Cement and

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	cEO	and material stores are secured prior to site closure			closure for more than 5 days	material stores
- Toilets must have been emptied and secured;	Contractor & cEO	Ensure toilets are emptied and secured prior to site closure	During the Construction Phase	dEO & ECO	Prior to site closure for more than 5 days	Toilets are emptied and secured prior to site closure
- Refuse bins must have been emptied and secured;	Contractor	Ensure refuse bins are emptied and secured prior to site closure	During the Construction Phase	ECO	Prior to site closure for more than 5 days	Refuse bins are emptied and secured prior to site closure
- Drip trays must have been emptied and secured.	Contractor	Ensure drip trays are emptied and secured prior to site closure	During the Construction Phase	ECO	Prior to site closure for more than 5 days	Drip trays are emptied and secured prior to site closure

5.34 Dismantling of old equipment

Impact management outcome: Impact to the environment to be minimised during the dismantling, storage and disposal of old equipment commissioning.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment;			N/A			
– Oil containing equipment must be stored to prevent leaking or be stored on drip trays;			N/A			
– All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers;			N/A			
– Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as to prevent spillage and pollution of the environment;			N/A			
– The Contractor must also be equipped to contain and clean up any pollution causing spills; and			N/A			
– Disposal of unusable material must be at a licensed waste disposal site.			N/A			

5.35 Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.						
Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site;	Contractor and cEO	Implement a rehabilitation plan; Dispose of all spoil and waste at a licensed waste disposal facility	Rehabilitation	ECO	Weekly	Rehabilitation of the disturbed areas is undertaken as per the rehabilitation plan. All waste disposal certificates are available.
– All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983	Contractor and cEO	Assess all slopes	Rehabilitation	ECO	Weekly	All slopes are assessed and contoured as required
– All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983;	Contractor and cEO	Assess all slopes	Rehabilitation	ECO	Weekly	All slopes are assessed and terraced as required
– Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition;	Contractor and cEO	Ensure all berms have a slope of 1:4 and is replanted with indigenous species	Rehabilitation	ECO	Weekly	All berms have a slope of 1:4 and is replanted with indigenous species and grasses
– Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners;	DPM	Ensure that lands must be rehabilitated by ripping which must	Rehabilitation	ECO	Weekly	Written permission from Landowners

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		be agreed to by the holder of the EA and the landowners				
- Rehabilitation of access roads outside of farmland;			N/A			
- Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;	Contractor	Make use of indigenous species for rehabilitation	Rehabilitation	ECO	Weekly	Indigenous species are used for rehabilitation
- Stockpiled topsoil must be used for rehabilitation (refer to Section 5.24: Stockpiling and stockpiled areas);	Contractor	Ensure stockpiled topsoil is used as per the requirements listed under section 5.24	Rehabilitation	ECO	Weekly	Stockpiled topsoil is used as per the requirements listed under section 5.24
- Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion;	Contractor	Ensure that topsoil is spread evenly	Rehabilitation	ECO	Weekly	Topsoil is spread evenly
- Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;	Contractor	Remove all visible weeds from placement area and topsoil before spreading the topsoil	Rehabilitation	ECO	Weekly	No weeds are visible in the placement area or the topsoil
- Subsoil must be ripped before topsoil is placed;	Contractor	Undertake the ripping of subsoil prior to the spreading of topsoil	Rehabilitation	ECO	Weekly	Subsoil is ripped before topsoil is placed
- The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;	Contractor	Plan the timeframe for rehabilitation in order to undertake vegetation planting during the optimal time for vegetation establishment	Rehabilitation	ECO	At the start of rehabilitation to confirm correct timeframe	Rehabilitation is undertaken during the optimal time
- Where impacted through construction related activity, all	Contractor	All disturbed slope	Rehabilitation	ECO	Weekly	Disturbed

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sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled;		areas must be stabilized				slopes are stabilized sufficiently
– Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly;	Contractor	Stabilize slopes as per the design specifications	Rehabilitation	ECO	Weekly	Slopes are stabilized as per the design specifications
– Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil.	Contractor	Spoil used for landscaping must be applied as per the listed requirements	Rehabilitation	ECO	Weekly	Photographic record of spoil used for landscaping purposes as well as feedback from the contractor
– Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following: a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area	Contractor in consultation with a suitably qualified specialist	Make use of a suitable vegetation seed mixture should enhancement be required	Rehabilitation	ECO	As and when required	Use of a suitable vegetation seed mixture if required

6 ACCESS TO THE GENERIC EMPr

Once completed and signed, to allow the public access to the generic EMPr, the holder of the EA must make the EMPr available to the public in accordance with the requirements of Regulation 26(h) of the EIA Regulations.

PART B: SECTION 2

7 SITE SPECIFIC INFORMATION AND DECLARATION

7.1 Sub-section 1: contact details and description of the project

7.1.1 Details of the applicant: FE De Rust (Pty) Ltd

Name of applicant: Thomas Condesse

Tel No: +33622665932 / 0845484264

Fax No: N/A

Postal Address: 15 Bridgeway Road, Bridgeway Precinct, Century City, 7441

Physical Address: 15 Bridgeway Road, Bridgeway Precinct, Century City, 7441

7.1.2 Details and expertise of the EAP:

Name of EAP: Marvin Grimitt

Tel No: 012 807 0637

Fax No: N/A

E-mail address: info@enviro-inisght.co.za

Expertise of the EAP (Curriculum Vitae included): Refer to Appendix 2)

7.1.3 Project name: De Rust PV1 Solar Energy Facility

7.1.4 Description of the project:

FE De Rust (Pty) Ltd (hereafter the Applicant) is proposing the development of a Solar energy facility (SEF) and associated infrastructure on a site located approximately 23 kilometers (km) south of Pofadder in the Northern Cape province of South Africa. The proposed development will have a generation capacity of up to 240MW which will feed into the National Grid.

The proposed study area for the SEF located approximately 23 km south of the town of Pofadder within the Khâi-Ma Local Municipality, in the Northern Cape Province of South Africa. The site can be reached via the R358, which branches off the N14.

The De Rust PV 1 SEF footprint is approximately 515 hectares (ha) and will be located on Portion 1 of the Farm Samoep 147.

The De Rust PV1 SEF will consist of PV panels, with a generation capacity of 240MW, depending on the available technology at the time. Additional ancillary infrastructure to the SEF would include underground and above-ground cabling between project components, onsite substation/s, Battery Energy Storage Systems (BESS), mounting systems

to support the PV panels, internal/ access roads (up to 10 m in width) linking the PV panels and other infrastructure on the site, and permanent workshop area and office for control, maintenance and storage. As far as possible, existing roads will be utilised and upgraded (where needed) with the relevant stormwater infrastructure and gates constructed as required. The perimeter of the proposed SEF may be enclosed with suitable fencing. A formal laydown area for the construction period, containing a temporary maintenance and storage building along with a guard cabin will also be established.

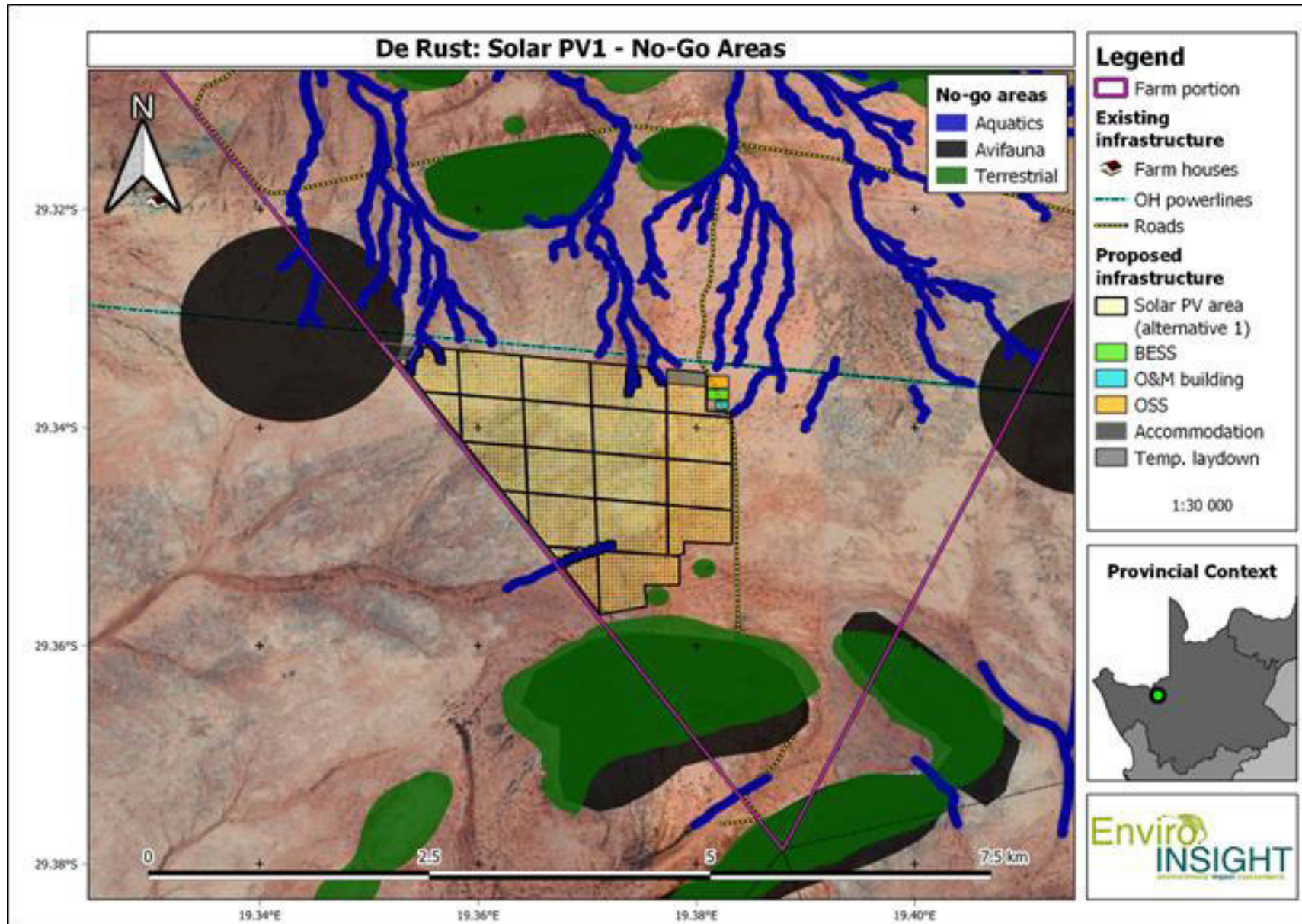
7.1.5 Project location:

NO	FARM NAME(if applicable)	FARM NUMBER(if applicable)	PORTION NAME	PORTION NUMBER	LATITUDE	LONGITUDE
1	Farm Samoep	147	Portion	1	29°20'46.09"S	19°23'0.86"E

Coordinates of the Onsite Substation			
Onsite Power Station	Point A	29°20'6.96"S	19°22'51.47"E
	Point B	29°20'11.01"S	19°22'51.59"E
	Point C	29°20'11.00"S	19°22'58.74"E
	Point D	29°20'6.95"S	19°22'58.68"E
	2.46ha		

7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: <https://screening.environment.gov.za/screeningtool>. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features within 50 m from the development footprint.



7.3 Sub-section 3: Declaration

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 day prior to the date on which the activity will commence of commencement of construction to facilitate compliance inspections.

Signature Proponent/applicant/ holder of EA

Date:

7.4 Sub-section 4: amendments to site specific information (Part B; section 2)

Should the EA be transferred to a new holder, Part B: Section 2 must be completed by the new holder and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted for an amendment to an environmental authorisation will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART C

8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and impact management actions must be included in this section. These specific management controls must be referenced spatially, and must include impact management outcomes and impact management actions. The management controls including impact management outcomes and impact management actions must be presented in the format of the pre-approved generic EMPr template. This applies only to additional impact management outcomes and impact management actions that are necessary.

If Part C is applicable to the development as authorised in the EA, it is required to be submitted to the CA together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and the name and expertise of the EAP, including the curriculum vitae are to be included. Once approved, Part C forms part of the EMPr for the site and is legally binding.

This section will **not be required** should the site contain no specific environmental sensitivities or attributes.

8.1. Site Specific Environmental Attributes

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
Terrestrial						
- Habitat Loss and Fragmentation	ECO / cEO / dEO	Avoid high sensitivity areas. All existing. Construction should be done in stages to avoid erosion and disturbance.	Construction	ECO	Monthly	No unnecessary clearance of indigenous vegetation to be undertaken
- Loss of species of conservation concern	ECO / cEO / dEO / Qualified botanical specialist	Undertake a comprehensive Plant Search and Rescue under a specialist supervision. Undertake the permitting process in order to obtain the relevant permits for the removal of protected species. Permits kept on file.	Construction	ECO	Monthly	Implementation of the Plant Search and Rescue Plan and photographic evidence and notes of the implementation of the plan
- Alien and invasive plant species	ECO / cEO / dEO / Qualified botanical specialist	A site-specific Alien Invasive Species (AIS) Management Plan must be implemented	Construction	ECO	Monthly	Implementation of the Alien Invasive Species (AIS) Management Plan and photographic evidence and notes of

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						the implementation of the plan
- Increased risk of erosion and flash floods.	ECO / cEO / dEO	Clearance of vegetation to occur in phases.	Construction	ECO	Monthly	Monitoring and mitigation should occur in terms of EMPr and Rehabilitation Plan.
- Direct faunal impacts due to operation.	Contractor	Only operational staff should be allowed onsite	Operation	DPM	Monthly	Register of staff onsite should be maintained.
- Alien and invasive plant species	Contractor	Monitoring of alien vegetation onsite	Operation	DPM	Monthly	Implement the AIS first year of operation and then monitor throughout life of operation
- The ecological impacts associated with the decommissioning phase will be similar to those listed in the construction phase and the associated mitigations measures must be updated and implemented to reduce potential adverse impacts	Contractor	Apply construction measures	Decommissioning	ECO/DPM	Monthly	Apply construction measures
Avifauna						
- Habitat destruction	ECO / cEO / dEO	Avoiding avifaunal specific sensitive areas and their associated buffers, such as the local drainage lines, impoundments,	Construction	ECO	Monthly	Maintain and monitor buffers.

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
		smaller watercourses, and pans				
- Destruction or disturbance of bird roosts	ECO / cEO / dEO	Apply necessary buffers for roost sites and other sensitive bird habitat features, avoiding the construction of turbines and access roads in these areas. Roads must utilise or upgrade existing farm roads as far as possible.	Construction	ECO	Monthly	Maintain and monitor buffers.
- Bird mortalities (turbine collision)	Contractor	Avoid placement of infrastructure near sensitive bird breeding and roosting habitats.	Operation	DPM	Once off	Monitoring of approved layout.
- Bird Mortalities powerline and fence collision	Contractor	The linear drainage line habitats must be buffered by a minimum of 50 metres from the edge of the demarcated wetland.	Operation	DPM	As required by PCM	Monitor sensitive areas as per post construction monitoring requirements
- Disruption of bird migratory pathways	Contractor	Post Construction Monitoring	Operation	DPM	Once off	Monitoring of approved layout.
- The attraction of some bird species	Contractor	Post Construction Monitoring	Operation	DPM	As required by PCM	Monitor sensitive

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
						areas as per post construction monitoring requirements
Bats						
- Loss or destruction of foraging and roosting habitat	ECO / cEO / dEO	All No-Go zone buffers must be adhered	Construction	ECO	Monthly	Monitoring of approved layout.
- Bat mortalities	Contractor	Continuous recording of environmental variables, such as temperature and rainfall will be required for operational bat activity data analysis and implementation of adaptive mitigations measures (including curtailment if necessary). Ensure infrastructure is bat proof. Bat detectors to remain onsite	Operation	DPM	As required by PCM	Post construction monitoring
- Artificial light	Contractor	All artificial lights should be kept at a minimum with only civil aviation lights being used if possible	Operation	DPM	Once off	Photographic Evidence

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
Aquatic						
- Operation of equipment and machinery	ECO / cEO / dEO	Environmental Induction and training of all staff.	Construction	ECO	Monthly	Training Register
- Clearing vegetation	ECO / cEO / dEO		Construction	ECO	Monthly	Monitoring of approved layout.
- Stockpiling of and placement construction materials	ECO / cEO / dEO	All No-Go zone buffers must be adhered.	Construction	ECO	Monthly	
- Excavating/shaping landscape	ECO / cEO / dEO		Construction	ECO	Monthly	
- Final landscaping, backfilling and postconstruction rehabilitation	ECO / cEO / dEO	Implementation of the stormwater management plan	Construction	ECO	Monthly	
- Alteration of drainage	Contractor	Implementation of the stormwater management plan Rehabilitation of site and revegetation of disturbed areas	Operation	DPM	Once off and maintenance every 6 months	Photographic evidence Rehabilitation sign off by ECO
- Alteration of surface water flow dynamics	Contractor		Operation	ECO		
- Establishment of alien plants on disturbed areas	Contractor		Operation	ECO		
Agriculture						
- Loss of agricultural potential by occupation of land	ECO / cEO / dEO	Increased financial security for farming operations by the leasing of the property	Construction	ECO	Monthly	Agreement with landowners and farmers.
- Loss of agricultural potential by soil degradation	ECO / cEO / dEO	Stormwater management Erosion control Maintain Vegetation cover	Construction	ECO	Monthly	Monthly Monitoring
- Dust impact	ECO / cEO /	Implement dust	Construction	ECO	Monthly	Monthly

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
	dEO	control measure				Monitoring
- Enhanced agricultural potential through increased financial security for farming operations	ECO / cEO / dEO	Positive impact	Construction	ECO	Monthly	Positive impact
- Improved security against stock theft and other crime	ECO / cEO / dEO	Positive impact	Construction	ECO	Monthly	Positive impact
- Protection of soil resources	Contractor	Stormwater management Erosion control Maintain Vegetation cover	Operation	DPM	Once off and maintenance every 6 months	Photographic evidence Rehabilitation sign off by ECO
- Protection of soil resources	Contractor	Stormwater management Erosion control Maintain Vegetation cover	Decommissioning	ECO	Once off and maintenance every 6 months	Rehabilitation approval by ECO and DFFE
Visual						
- Visual intrusion due to the removal of vegetation, movement of construction vehicles and heavy machinery, presence of laydown areas and site clearance	ECO / cEO / dEO	Limit the construction footprint to only the development area Dust Management Only focus light where it is needed.	Construction	ECO	Monthly	Monitoring of approved layout.
- Light pollution due to night lighting	ECO / cEO / dEO		Construction	ECO	Monthly	
- Dust pollution due to site clearance and movement of construction vehicles and heavy machinery.	ECO / cEO / dEO		Construction	ECO	Monthly	
- Change in visual/landscape character and sense of place due to the presence of the wind turbines and ancillary infrastructure	Contractor	Painting of turbines white and natural colours for axillary infrastructure Maintenance of	Operation	DPM	Once off and then as required	Photographic evidence Maintenance register
- Visual intrusion from the wind turbines dominating the skyline in a largely natural area	Contractor		Operation	DPM		
- Visual intrusion from the movement of construction vehicles and heavy machinery	Contractor		Operation	DPM		
- Light pollution due to night lighting, security lighting and	Contractor		Operation	DPM		

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
navigational lighting		all infrastructure onsite				
- Dust pollution from operation and maintenance vehicles.	Contractor		Operation	DPM		
- Visual impact on the identified sensitive receptors	Contractor		Operation	DPM		
- Visual impact on the identified sensitive receptors, specifically the identified homesteads	Contractor		Operation	DPM		
- Visual intrusion and dust creation from the movement of construction vehicles and heavy machinery	Contractor	Revegetation of disturbed areas Dust suppression	Decommissioning	ECO / DPM	Throughout the decommissioning phase	Rehabilitation approval by ECO and DFFE
- Change in landscape character due to the removal of infrastructure	Contractor	Revegetation of disturbed areas Try to return the area to its natural state as per the surrounding areas	Decommissioning	ECO / DPM	Throughout the decommissioning phase	Rehabilitation approval by ECO and DFFE
- Light pollution due to night lighting	Contractor	Revegetation of disturbed areas	Decommissioning	ECO / DPM	Throughout the decommissioning phase	Rehabilitation approval by ECO and DFFE
- Dust pollution due to infrastructure removal and movement of construction vehicles and heavy machinery	Contractor	Dust suppression	Decommissioning	ECO / DPM	Throughout the decommissioning phase	Rehabilitation approval by ECO and DFFE
Heritage						
- Disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	ECO / cEO / dEO	Implementation of a Chance Find Procedure for the project Avoidance of sites of high significance.	Construction	ECO	Monthly	A Chance Find Procedure for the project if required
Social						

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Employment, business opportunities and skills development impact rating	ECO / cEO / dEO	Employment of Locals first approach and use of local businesses for supplies where possible Training of locals	Construction	ECO	Monthly	Proof of communications with the local municipality Training register
- Construction workers on site and in local area	ECO / cEO / dEO	Employment of Locals first approach and use of local businesses for supplies where possible Transport agreement and contracts with local staff	Construction	ECO	Monthly	Database of staff including medical history.
- Risk to safety, livestock, and damage to farm infrastructure	ECO / cEO / dEO	Agreement with local farmers Security and training for staff and landowners onsite	Construction	ECO	Monthly	Contracts with farm owners impacted to compensate for damages or loss Training register
- Increased risk of grass fires	ECO / cEO / dEO	Agreement with local farmers Compliance with EMPr	Construction	ECO	Monthly	Contracts with farm owners impacted to compensate for damages

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance or loss
						Compliance with EMPr
- Nuisance impacts associated with construction related activities	ECO / cEO / dEO	Implementation of a complaints register	Construction	ECO	Monthly	Complaints register to be stored onsite in environmental file
- Renewable energy infrastructure and clean renewable energy	Contractor	Employment of Locals first approach and use of local businesses for supplies where possible Training of local employees	Operation	DPM	As required	Proof of communications with the local municipality
- Creation of employment and business opportunities	Contractor	Employment of Locals first approach and use of local businesses for supplies where possible Training of local employees	Operation	DPM	As required	Proof of communications with the local municipality
- Generation of income for landowner	Contractor	Agreements with affected landowners should be in place before WEF becomes operational	Operation	DPM	Once off	Contracts with farm owners
- Social Economic Development and Enterprise Development (SED)	Contractor	Support of the SED	Operation	DPM	Annual Reporting	Proof of communications with the SED and municipality

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Visual impacts and associated impact on sense of place	Contractor	As per visual mitigation measures	Operation	DPM	As per visual mitigation measures	As per visual mitigation measures
- Impact on property values	Contractor	N/A Positive Impact	Operation	DPM	N/A Positive Impact	N/A Positive Impact
- Impact on tourism	Contractor	N/A Positive Impact	Operation	DPM	N/A	N/A
- Deconstruction of the infrastructure and recycling	Contractor	Employment of Locals first approach and use of local businesses for supplies where possible	Decommissioning	ECO / DPM	As required	Database of staff including medical history.
- Loss of jobs and associated income	Contractor	Notification of staff prior to shutdown	Decommissioning	ECO / DPM	As required	Employment contracts
Noise						
- Daytime WTG construction activities	ECO / cEO / dEO	N/A	Construction	ECO	Monthly	N/A
- Night-time WTG construction activities	ECO / cEO / dEO	Notify the NSR when night-time activities will be taking place within 1,500m from the NSR	Construction	ECO	Monthly	Photographic Evidence
- Daytime operation of WTG considering the worst-case SPL	Contractor	N/A	Operation	DPM	N/A	N/A
- Night-time operation of WTG considering the worst-case SPL	Contractor	The significance of the noise impact is low and no additional mitigation is recommended.	Operation	DPM	The significance of the noise impact is low and no additional mitigation is recommended.	The significance of the noise impact is low and no additional mitigation is recommended.
- Potential Cumulative Noise Impacts	Contractor		Operation	DPM		
Traffic						

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Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
- Increase in traffic volumes on the surrounding road network as a result of construction traffic	ECO / cEO / dEO	Implement Transport Management plan	Construction	ECO	Monthly	Keep Transport Management Plan in Environmental File

APPENDIX 1: METHOD STATEMENTS

To be prepared by the contractor prior to commencement of the activity. The method statements are **not required** to be submitted to the CA.